



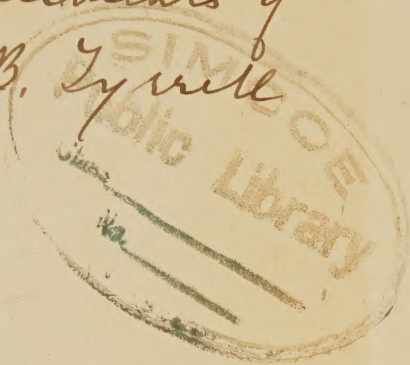
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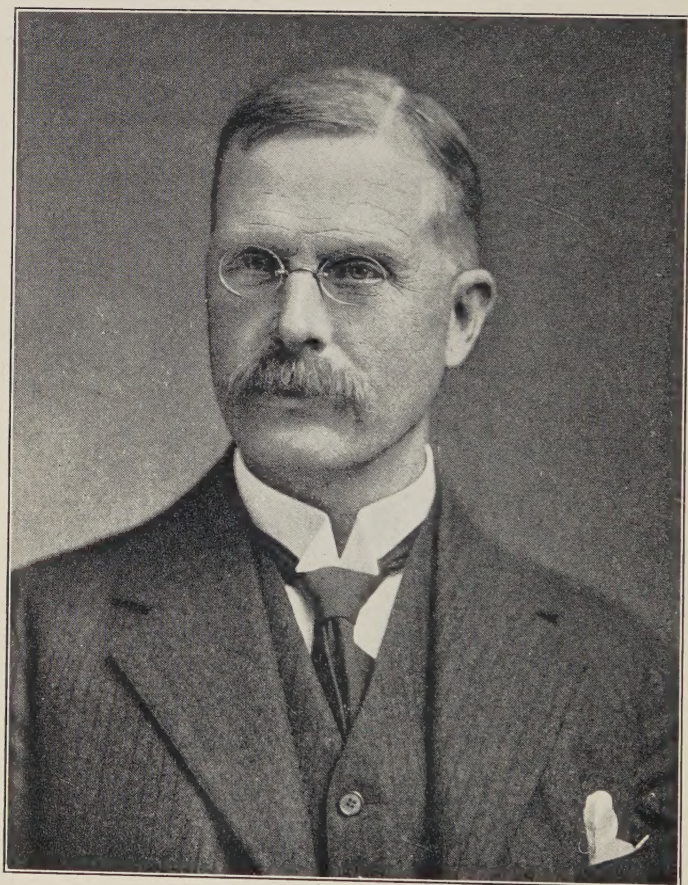
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A CANADIAN GEOLOGIST



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J. B. TYRRELL

1750

SIMCOE
HALL
1927

A CANADIAN GEOLOGIST

BY
W. J. LOUDON, B.A.

B.
L92.



TORONTO: THE MACMILLAN COMPANY OF
CANADA LIMITED, AT ST. MARTIN'S HOUSE
1930

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T. H. BEST PRINTING CO., LIMITED
TORONTO, ONT.

INTRODUCTION

It has been a pleasant task to write this biography of an old friend whom I knew as a boy at school, afterwards at the University of Toronto, and with whom I have had the most intimate contact during the past two years; sitting around his fire-side on winter afternoons and evenings, listening to his stories of a busy life, spent chiefly in the heart of that great country which lies north of latitude fifty and stretches from the Pacific Ocean to the western shore of Hudson Bay.

In preparing the book I have been given the fullest co-operation both of Mr. Tyrrell and his wife. Diaries, reports, maps, journals, everything was placed at my disposal. In addition, I have had the advantage of many private conversations which threw new light upon incidents that otherwise might have been misunderstood.

Gradually, after much unconscious cerebration, there grew up within my mind the picture of a man whose life was spread before me as the leaves of an open book: nothing omitted, nothing concealed: and I have endeavoured to paint this picture in the hope that my story of a scientist

and pioneer may not only afford good reading but may prove an inspiration to the younger generation of Canadians who, with brave hearts and steady eyes, turn their faces ever to the North.

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A CANADIAN GEOLOGIST

CHAPTER I

JOSEPH BURR TYRRELL

JOSEPH BURR TYRRELL was born on November 1st, 1858, at Grange cottage in Weston, Canada. When he was a year old his parents moved to their new home which had been built on the corner of King and North Station streets: and there he spent his boyhood days, until the time came for his departure to College.

His earliest recollection is of the bush. When he was three or four years old, he remembers distinctly that he went with his father on a little journey of about two miles to a neighbouring wood, an acre in extent, filled with forest trees, principally hemlock, maple, and oak. His father had bought the "cut" of this for firewood: so, one fine winter morning William Tyrrell took his son by the hand, and they started down along the Grand Trunk railway track to the wood lot, where men had been hired to chop down the trees, and saw and split them for winter use. It was a long trip for the little fellow who walked all the way; but, when they reached their destination he was rewarded by the pleasant sight of a large camp fire, at which the men were preparing

lunch. He remembers that he was very tired, but, at the sight of the fire, immediately regained his strength and began to inspect the strange things he saw for the first time.

It is not difficult to imagine his childish delight at the wonderful spectacle, which though rarely seen at the present day, except in remote places, was common enough in the life of the early pioneer.

Picture a fire blazing in the very heart of the woods, on an open spot strewn with chips and surrounded by stumps of fallen trees: a pile of cordwood at one side, four feet in length: beyond, great lofty maple trees so close together that one could barely see the blue sky above: the wood-choppers with their high top boots and coloured flannel shirts: a great long saw with sharpened teeth, and axes, whose gleaming edges were imbedded in a cedar stump: and the fascination of the fire itself, from which long reddish tongues of flame leaped forth and died away amidst a shower of tiny sparks that rose and fell and disappeared within a veil of bluish smoke, curling in spirals through the frosty air.

Two long maple logs had been placed side by side, upon the ground, about a foot apart: the space between at one end filled with pine cones, dry branches, sticks, hemlock bark of various sizes, which were then set on fire. Across the logs lay a green stick from which was suspended

a tin pail half full of water. Alongside, a frying pan in which some slabs of pork were crackling: and, upon one log, remote from the fire, were arranged a loaf of bread, a butcher knife, some tin cups and plates, and a little basket containing salt and tea, one spoon, two apple pies, some cookies, and a cake of maple sugar.

When lunch was ready, young Joe was placed on one of the logs, with a horse blanket beneath him to keep him warm and enjoyed what was to him the most wonderful thing of all, his first meal in the bush. Many times afterwards he ate beside a camp fire, in the forests of Northern Canada, on the prairie in the West, upon the edge of the barren lands of the far North, or within sight of the ice floes of Hudson Bay; but, of all his adventures, none stands out more clearly now in his recollection than this, his first lesson in the great Art of woodcraft.

Shortly afterwards, he was sent to the Public School, about which he remembers nothing except that he came home one day and cut off his golden curls because some of the children had teased him and called him a girl. Later on, he was sent to a private school where he made good progress, obtaining a prize when he was a little over four years old for spelling a number of words correctly, amongst them being Mediterranean.

When he was eight years of age he was sent to

Weston Grammar School, where the master was a Mr. Hodgson, from Yorkshire, whose son, J. E. Hodgson, a graduate of the University of Toronto of 1874, was well known in the seventies and eighties as a fine classical scholar and just as fine a cricketer, and was afterwards for many years an Inspector of High Schools.

Mr. Hodgson conducted the old Grammar School at Weston according to a method of his own: when he was in good humour an excellent teacher, but, when afflicted with gout, as he often was, punishing everyone indiscriminately. Sometimes, in a rage, he would throw a heavy ruler across the room at an unruly boy: at other times, using the cane and rawhide freely on disobedient pupils. However, he managed to implant many Greek and Latin roots in the heads of his wayward scholars and even succeeded in driving the principles of Latin grammar into the head of young Joe Tyrrell who began to read Cæsar intelligently when he was but nine years old.

In 1869 a new master was appointed to the school, John Somerville, who obtained his B.A. degree in the University of Toronto in that year, being a medalist in Philosophy. Professor Alfred Baker, a fellow graduate of 1869, remembers him as a most accomplished teacher, who afterwards entered the ministry of the Presbyterian church.

Mr. Somerville took a great interest in young Tyrrell, in whom he perceived an extraordinary desire for knowledge, especially for those branches which dealt with Nature and Science: and to whom therefore he gave much encouragement. In addition to giving him a thorough grounding in the elements of Mathematics, he gave him also the best advice about English Literature: lent him books, took walks with him into the forest and along the river Humber, and unconsciously implanted in him not only a strong love of good reading, but also those principles of truth and justice, tempered by kindness and sympathy, which he was so well qualified to teach. It is sufficient to say that young Joseph, under the care of his master, had soon read many of the best books in literature, including all the standard novels then in vogue, such as *Lorna Doone* and *Jane Eyre*, and all of Scott's works, prose and poetry, before he was twelve years old.

During his school days, his home life was very happy and spent amidst the most pleasant surroundings. A kind father, a loving but strict mother, affectionate brothers and sisters, were always ready to lend him a helping hand on the road to knowledge. But it is to his maternal grandmother, Hester L'Amoureux, that he probably owes most, as far as little deeds of kindness were concerned. To her he always went in trouble and from her he always got sympathy

and good advice. She told him stories of her early life and instilled in his plastic mind, more than anyone else, the desire for exploration and adventure. It is probably also from her that he inherited his strange liking for solitude within the bush.

While at school and during the summer holidays his favorite pastime was to walk up and down the banks of the Humber river and amuse himself by studying the natural history of the region, collecting specimens of rocks and stones, trilobites, bugs and beetles, as well as birds and animals. At that time the river banks were clothed with forest trees and abounded in game birds of all kinds, as well as the ordinary animals, squirrels, red and black and grey, muskrat, mink and coon.

Fish were plentiful in the river and in the little streams that fed the Humber, notably Chaffey's creek, where young Joe spent many a happy hour, especially in the spring time, fishing for speckled trout.

On his expeditions up and down the Humber he always travelled alone, being, as previously stated, of that strange disposition which prefers solitude to company: a state of mind rarely met with except in remote regions amongst the trappers and voyageurs of our northern land. Lapse of time has changed Joe from Youth to Age: young Joe has become old Joe: but even now he

has not overcome his dislike for crowded streets and busy cities.

His amusements as a boy, were varied; but all pointed in the same direction and towards a final goal, and were concerned chiefly with the scientific laws of Nature: the lives of insects, birds, animals, and fishes: the structure of the Earth and all that it brings forth to man. As a mere child he collected countless insects, butterflies, moths: caught crayfish by the dozen underneath the flat stones which covered the bed of the Humber, and kept them at home in his bath tub: captured snakes and reptiles and mudturtles in the marshy spots below the Mill and put them in the cellar or the barns, there to keep company with cages of white mice and pens filled with rabbits, all of which were kept under his boyish supervision so that he might study their habits in captivity. He caught many kinds of fish in the river and adjoining creeks; but he was not a born fisherman, and, although in emergency he was always ready to angle with a rod or use a spear or net, yet his greatest pleasure, from the time he could stand steadily upon his two feet, was to handle a rifle or a shotgun. Firearms always seemed to have a fascination for him from his earliest days.

The first shot gun he had was a single barrelled one, owned by his grandfather and used in the Irish rebellion of 1798. This was after-

wards altered, repaired, and provided with a nipple for percussion caps: and, almost as soon as he could walk with any ease, this weapon was given to him by his father, along with a powder horn and a pouch for shot. With this gun, after some practising at pieces of paper, bottles, and other marks, he was able to shoot his first squirrel. Afterwards, as he grew a little older and bigger he became very skilful with the gun, under the tutelage of his father's hostler, a man named Brian Mahon, who had lived in the south of Ireland during most of his early life and was an expert with all kinds of firearms.

When he was twelve years old young Joe was an excellent shot, and never returned from a shooting expedition down the Humber valley without bringing home his game bag well filled with partridge or woodcock: sometimes with a few black squirrels, which made excellent pies, or a brace of black duck, blue or green winged teal, which were very plentiful in the fall of the year. At this season great clouds of game swept South and always stopped a few days to rest in the marshes that lay at the mouth of the Humber, near the Lake. In October, before the cold weather set in, flocks of wild pigeons, long since unknown to sportsmen, used to swarm about the outskirts of Toronto, on their migration to the Andes in South America, and furnished plenty

of shooting to young Tyrrell when he was a boy and haunted the woods about the Humber.

It is to the training, during his boyhood, in the use of the shotgun, that Joe Tyrrell owes his subsequent accuracy at the rifle ranges and in revolver shooting out on the prairies of the West: for as soon as he had learned to use the shotgun, so that he could shoot from either shoulder and kill birds on the wing with some degree of accuracy, he took to the rifle, and soon became more proficient in the use of the rifle than with the shot gun. His father had a double-barrelled rifle and he used to practise with it at his home in Weston, shooting at a mark and at objects thrown up in the air, gradually increasing his distances, until he could shoot the head off a partridge one hundred feet away. His accuracy with the rifle stood him in good stead in later years, particularly on his expeditions to the far North, where his own life and oftentimes the lives of the *voyageurs* who accompanied him depended on his skill.

When he first went to the Rocky Mountains in 1883 there were many expert revolver shots crossing through the country, and he was ambitious to shoot as quickly and accurately as any of them. While travelling his revolver hung in its holster on his saddle, and he practised with it every day: and soon became a dead shot. His early training at Weston, as well as his natural

talent for shooting, gained for him the reputation of being one of the best revolver shots in the country. Tyrrell's friends know little of this accomplishment, about which he is always modest; but those who camped with him on the plains and lived in the turmoil of the early mining camps of the Klondike can testify as to his skill. In those days, when he was in his prime, he could blow out a candle at twenty paces or take the head off a bottle at twice that distance: using his revolver as freely and easily as the ordinary person would use a shot gun or rifle. He never practised fancy shooting over his shoulder or with the aid of a mirror; but there is no doubt that, as far as quick drawing and accurate shooting were concerned, he was able to hold his own with the experts who mined and drank and gambled and shot their way through the camps of the West. Not long ago I listened to a story told me by himself which will bear repetition here and which will prove the truth of what the men in the North used to say of Joe and his shooting with a Colt.

He was on horseback one afternoon on the western plains, accompanied by a well known trapper who was no mean shot himself, and who offered to bet him a small sum that he could not kill a dozen rabbits in succession as they ran across their trail. Joe, who was carrying two long Colt revolvers in his holsters by the saddle,

immediately agreed: and shortly afterwards, arriving at a place where the rabbits were thick, and jumped to and fro as only rabbits can jump, he began to fire at the animals, which were of all sizes and ages: and shot thirteen in succession for good measure, much to the disgust and admiration of his companion. If you have ever tried to shoot from horseback, especially with a short barrelled gun or a revolver you will understand what a feat this was. The trapper just then saw a hawk sitting on an adjoining tree about sixty yards away and offered to bet another larger amount that he could not kill the bird. Whereupon he immediately raised his pistol and aiming at the hawk, fired, and it dropped to the ground dead.

CHAPTER II

AT COLLEGE

SOON the time was at hand when the destiny of young Tyrrell was to be decided. He was making great progress at Weston Grammar School; but, learning that one of his companions had gone to Toronto, to take a course at Upper Canada College, there came into his mind a great longing to go to that school. Perhaps he might have obtained just as good a training at the Weston school, but desire became an obsession in his youthful imagination: and he finally persuaded his father to send him to that famous school about which he had heard so much from his acquaintances and from the reports in the daily papers.

So in September, 1874, when he was almost sixteen, his father took him to Toronto and he was entered as a student at the old College which used to face on King street, between Simcoe and John streets. It was at that time that I first met Joe Tyrrell, a tall fair-haired, handsome boy, big for his age, with bright blue eyes and a pleasant laugh.

George R. R. Cockburn was Principal, William Wedd taught Classics, James Brown, Mathematics, a little man named Schluter taught French and German: and a course in writing and bookkeeping was given by a man named Thomson. Once a week we had the great privilege of going down into Michael Barrett's room to listen to his lectures on Chemistry or Geography. He was a typical Irishman of the finer type, had travelled all over the world in his youth, and was an excellent speaker and teacher. The afternoon we spent with him each week was looked forward to by all the pupils, good, bad and indifferent: for he had some charm of manner or magnetism that everyone liked: and such a thing as *kicking up* in his room never even entered a pupil's mind. Last but not least was Johnny Martland who was supposed to teach English, and was also a sort of headmaster at the boarding house which adjoined the school. He was a tall, big, red faced man, with a large purple nose, a dark forbidding eye, and always wore a cap and gown.

Joe was a day boy, that is to say, he belonged to the class which did not live in the boarding house, and which, although its members were largely in the majority, was considered by those pupils who boarded in the College, as perhaps slightly inferior in some way difficult to define. It seems to be a natural law of education that

students who live on the premises are, or at least think themselves to be, slightly superior, in some intangible way difficult to describe, to those who merely attend a school or college only for the ordinary purposes of learning and do not enjoy the peculiar advantages to be derived from eating and drinking and sleeping under a common roof. Residence students always think themselves to be of a slightly higher order than those who live at home or in random boarding houses where perhaps the accommodation is much more select. Such seems to be the natural law.

We all learned much of the Classics at Upper Canada. "Billy" Wedd was a little lenient, but his knowledge of Greek and Latin was profound and one could not help but learn something of the great writers of ancient times. And is there any boy of that time so cold and hard that he has forgotten the Greek Testament which used to be taught on Friday afternoon by "Guppy" Brown? I think at examination time Joe Tyrrell and I used to be bracketed equal in our knowledge of the new Testament in Greek.

Joe boarded on Temperance street along with a young fellow named John Maclaren from Buckingham on the Ottawa. He is remembered as a fine fellow and a wonderful athlete.

At the end of that year at the College Joe stood fourth in his class and had made such pro-

gress that his father sent him back the following year, when he enjoyed the doubtful privilege of joining the *élite* and living in the boarding house under the stern eyes of John Markland, Alfred Baker, and Tommy Wicher. Unfortunately, he became ill that year and was forced to return home, where he remained from March until September. He had caught a slight cold which developed into pneumonia and left him with weakened lungs. However, he managed during that summer to prepare his work for matriculation into the University of Toronto and entered that institution as a first year student in the fall of 1876, to keep company with the famous class that graduated in 1880.

His academic standing at matriculation and during the following four years is given here: At matriculation he obtained second class honours in Mathematics and English, passing also in the other compulsory subjects. In his first year he obtained a scholarship in general proficiency, being first class in Chemistry and second class in Classics, Mathematics, English, French and German.

In the formidable pass lists of the second year he stood high up: obtaining first class honours in Chemistry, Biology, and Mineralogy and Geology. He was awarded the only scholarship in Natural Science of the second year. In the third year, against such competitors as A. B.

Macallum, afterwards professor of Biochemistry in the University of Toronto, he obtained the scholarship in Natural Science: and also stood first class in all the subjects of his fourth year. In addition to his regular work in the third and fourth years he took a course in Meteorology, which at that time was taught in the University by Professor Kingston of the Magnetic Observatory, and obtained a prize in that subject.

During his freshman year he boarded at first with three others friends, Henry Nason, J. E. Wetherell and A. K. Blackadar, who are mentioned here because they were well-known scholars in former days and because they are all still alive. The quartette rented three furnished rooms in a house which used to stand on the Commons near St. Patrick street, two bedrooms and a common sitting-room: bought their own food, which was cooked by their landlady, and lived on about ten dollars a week. But this community arrangement soon failed to satisfy their individual tastes, and they separated: Joe Tyrrell going to board with a family nearby where he only remained a week, as the lady of the house had never taken boarders before and complained to Joe that she could not afford to give twenty-one meals a week and bed for five dollars.

Joe then migrated to Teraulay, now Bay street, at that time a favorite rendezvous of students: and for the rest of the year lived with

Albert Horton, the well-known Hansard reporter. Horton's house stood on the west side of the street, below Hayter, and, as it was at that time commodious and also convenient to College avenue, Joe was quite comfortable under the care of Albert Horton's mother and sister, remaining there until the end of his second year.

All that he remembers about his first year could be put in a nutshell. He spent most of his time in studying German, which he had never studied before, and soon was able to read scientific books in that language. He also joined the University, or K, Company of the Queen's Own Rifles: and every Saturday afternoon, when the weather was fine, he practised rifle shooting at the butts near the Old Fort, and became so proficient that he won as a prize that year for the highest individual score a solid gold chain which he still wears. In addition, he won, at special distances, 900 and 1,000 yards, a volume of poems and an ancient cruet stand, which, however, have long since disappeared.

The summer holidays, of 1877, he spent at home, doing a little reading, less farming, and endeavouring to build up his constitution: for, although he was of strong physique and very muscular, and in many ways endowed with great vitality, he had a tendency towards weak lungs, which was always increased by indoor study and crowded rooms. Sunlight, the open sky, and

forest trees were to be henceforth his chief delight.

During his second year he began, in earnest, the study of Biology, under the supervision of Ramsay Wright who had just been appointed professor in the University and from whom Joe received much aid in the elements of that science, especially those relating to insects and parasites.

His third and fourth year were spent in Residence, where he lived in the second house, by the entrance gate, in a room on the top flat facing west, along with J. D. Cameron, E. R. Cameron and Jimmie Chisholm. Charlie Millar and S. C. Smoke were beneath. They were all industrious students, and Joe, if he learned nothing else during those years, at least began to see clearly that system and not desultory reading counted most at examination time. Chisholm, the two Camerons and Millar were exponents of that systematic method of working, which not only gave them all gold medals in their final year, but also remained with them through life and was the foundation of their continued success after leaving the University. They were all blessed with good memories and perhaps more than average ability; but in addition, they had developed a system of steady work, so many hours each day, with which nothing was allowed to interfere and which accomplished more than any amount of

spasmodic work even when combined with genius.

The two most brilliant students of that time, J. D. Cameron and Charlie Millar, are dead. Jimmie Chisholm is still practising law in Hamilton and E. R. Cameron holds forth at the Supreme Court in Ottawa. Millar's roommate, Smoke, the very antithesis of Charlie, except as regarded work, has long since passed away.

In his third year, through the kindness of Ramsay Wright, Joe was enabled to buy a good microscope, with Zeiss lenses: this was his chief companion in his third and fourth years and for many years afterwards. In fact, during his fourth year he spent so much time with this microscope that he was forced, in the Spring of 1880, to put in extra time fagging up his book work for the final examination, rising each morning at five o'clock and studying until midnight. This was hard on his constitution and no doubt contributed largely to his subsequent illness.

After graduation, he suddenly conceived the idea of taking a course in Law and entered the firm of Rose, Macdonald, Merritt and Coatsworth as a student, passing several examinations that year. But, having some trouble with his lungs, he consulted his physician, the well-known Dr. James H. Richardson, who advised him to take to the woods. He was in a quandary for some time but finally, through his father's influence,

and the friendship of Mr. Dennis, the Deputy Minister of the Interior in the Dominion Government, obtained a position in the Geological Survey at Ottawa, with the hope of being able, ultimately, to start exploratory and geological work throughout the far North.

CHAPTER III

THE GEOLOGICAL SURVEY

AT that time the Survey was under the direction of A. R. C. Selwyn, who was a scientist of note, and a cultured gentleman and scholar. Under his care Tyrrell learned a great deal about the writing of English, a gift which few men, especially of a scientific turn of mind, either possess or cultivate. Selwyn's method was to correct his men's reports and return them for digestion and alteration. He then discussed the changes with them personally, spending much time and taking endless trouble in giving them advice about the meanings of words, and pointing out the advantage of using simple words to convey the proper meaning to the minds of the ordinary reader.

Joe at first resented this treatment of his reports very much, but, after a few bouts with Selwyn, it began to dawn on him that although he was somewhat of a writer himself and had had a fair classical training and knew the meanings of the words he used, yet his English was no match for that of Dr. Selwyn. In fact he now admits that it is to Selwyn he owes his ability to

write a letter or short report which will convey to the minds of others his own thoughts and beliefs, although perhaps his University training, especially in the Classics, enabled him to appreciate the finer decisions of his first Master of English.

In the Fall of 1881 Joe entered the Service at the small salary of five hundred dollars a year, and it is indicative of his scientific leaning that, out of his first monthly cheque, he spent forty dollars in the purchase of a standard work on spiders and mites, written by some German with an unpronounceable name. His month's board had been already paid in advance. He still has the work, which is in forty volumes, each volume containing twenty hand-coloured plates of minute forms of life: it is even yet a standard work and probably worth many times what he paid for it.

He studied those forty volumes carefully, and during the following winter, prepared a paper for the Transactions of the Field Naturalists' Club at Ottawa. I remember hearing him read the paper, but have forgotten all about its contents because, at the time, it was all Dutch to me.

His time during the winter of 1881-2 was spent in sorting fossils for the Museum of the Survey, which formerly had been in Montreal but was transferred that year to the seat of Government at Ottawa. The fossils were ship-

ped in large cases, and it was Joe's work to unpack and identify tens of thousands of the specimens of bygone ages. The monotony of this work was broken, however, by frequent trips of exploration into the surrounding country, through the Chelsea hills, and along both sides of the river Ottawa: generally alone with a book for leaves and plants, a shoulder bag for other specimens, and a single-barrelled gun to keep him company: sometimes he was accompanied by a young companion who was interested in Science, but who practised Law in Ottawa, and afterwards in Toronto, where he is now known as Chief Justice Latchford.

Joe had the usual experience of most people who go to live in Ottawa and are not accustomed to traffic on a large river. He was crossing the Ottawa river in Winter near Nepean point, on the ice, and, knowing nothing about the currents and eddies of the stream which continually wear away the ice even below zero, broke through some thin ice and had great difficulty in getting back on solid ground.

A year slipped by and Winter came again. Joe's health was much improved by the dry air, the wonderful atmospheric conditions, and the salubrious climate of the Ottawa valley; but desire for exploration in the northern country took hold of his Irish imagination, especially when he listened to the stories of the surveyors

and field geologists who returned from the West every Fall and spent the Christmas holidays sitting round the draughting tables of the old Geological Survey on Sussex street, with pipes going full blast, or, with their knees beneath a table in the old Bodega sitting room, smoking choice cigars that had never paid the Customs duty, and sipping from a tumbler filled with Scotch or rye.

Joe listened attentively that Winter to the tales of his office companions and decided to ask that he be allowed to take the field the following Spring. So he interviewed his chief, Dr. A. R. Selwyn, who assigned him as assistant to Dr. George M. Dawson on an exploratory trip to the Rocky Mountains. The great wish of his boyhood life was thus about to be realized: and the greatest man in the Service, from a scientific point of view, was to be his leader on the trip, which was undertaken from a geological standpoint and was supposed to include a survey of the southern Rocky Mountains for minerals—copper, gold and coal.

Dr. George M. Dawson was a son of Sir William Dawson, principal of McGill University at Montreal and was a graduate from that College, where he had reaped all the benefits of scientific companionship during his student life. In addition to his scientific attainments, he was a good practical geologist, a cultured gentleman,

with a full knowledge of Literature, both French and English, an accomplished writer: and the best *raconteur* in the whole Civil Service, a fact which was vouched for by the Marquis of Lorne, at that time Governor-General and an intimate friend of Dr. Dawson.

Though a hunchback, and small in stature, he was one of the hardiest of travellers and could eat and drink and hold his own with the most robust, whether at the dinner table of Rideau Hall, or in an Indian camp. He was strangely indifferent to the welfare of his men upon a trip. They might eat or not, sleep or lie awake, be eaten up by flies, be cold, wet, sick or hungry; but as long as they did their work nothing else mattered.

On the other hand, he had infinite patience, and all the qualities of the teacher: would sit for hours explaining abstruse points in Geology or listen with the most careful attention to the questions of his men, as long as they related to the work under exploration. His hours of relaxation were spent usually in fishing about the camp. If he happened to pitch tent near some swiftly flowing stream or below some fall in any of the numerous mountain streams he would go off with a rod and line, a batch of flies sticking in his hat, and cast for rainbow trout, at that time numerous in every creek or stream flowing from the mountains. Sometimes he would catch two

or three at a time, and his face would then break into a peculiar happy expression that passed muster for a smile. Another pleasure which seemed to appeal to him was the smoking of cigarettes, which he rolled all day long, beginning the first thing in the morning and ending the last thing at night.

Dawson spared himself less than his men: worked with all the energy of a giant, and never complained of being tired, hot, cold or sick. As a result, his men, who were all twice his weight and half again as tall, were ashamed to complain to the little man, and would have suffered untold miseries rather than let him know that they were tired or had any bodily ailment. He knew how to get the best work from each man and treated him accordingly. Everyone trudged on from day to day, toiling and slaving, doing the best they could, even although they resented the fact that they were following a man whose sole idea was to accomplish some given piece of work at any cost. Dawson certainly did his work well and from the standpoint of efficiency he was in the front rank. He would have made an excellent general or commander of an army, because in addition to his driving qualities he had education, scientific training and foresight. Such was the leader whom Joe Tyrrell followed on his first journey to the Rocky Mountains.

In May, 1883, their party arrived at Brandon

in Manitoba, at that time the last distributing point for the West and the stepping off place for the prairie. Here Dr. Dawson purchased an outfit: horses, wagons, provisions and tents: engaged his men: and then went on to Swift Current, which at that time was the terminus of the railway for passenger traffic. From this point construction trains ran to Maple Creek, which the party finally reached by means of box cars and open flat cars, on which their baggage was transported. Maple Creek at that time was the headquarters of the Northwest Mounted Police, with Col. Irvine as chief, the service having been established about 1876 for the preservation of order and law in the northwest territories, as well as for the protection of prospectors and settlers. In the early eighties travelling on the prairie was not only difficult and tedious but very often dangerous. In 1883 great improvement had taken place in the general condition of the surrounding country, but still there was always the danger of a lurking thief or renegade whose depredations were usually carried on by night. Horses and provisions were liable to be stolen: lives were often sacrificed on trips to the mountains: and more than one party had disappeared forever. Col. Irvine begged Dawson and his party not to proceed to the mountains on their proposed trip; but the little doctor, who was as brave as a lion, only laughed and assured

the Chief of Police that they would round up their horses and wagons every night and keep a man with a rifle always on guard until dawn: and, with this assurance, the whole party was allowed to go on their way rejoicing.

The object of the expedition was, briefly, the exploration of the Crow's Nest Pass, the North Kootenay, the South Kootenay, and the Kicking Horse Passes, as well as the country in the neighbourhood of the foothills on the east side of the mountains. A geological and mineralogical survey was to be conducted. In addition Tyrrell was to act as biologist to the party, making collection of plants and flowers, fossils, and other specimens of natural interest. A sextant, and artificial horizon, barometer, compasses, thermometers, and other instruments were carried to enable the party to determine their positions and the temperatures in the mountains at night.

They started out bravely across the prairie, taking a southwesterly course, and in about ten days struck the Milk river, a branch of which they crossed near the boundary line of Montana: and then, keeping in the valley of the Milk river, they turned north to Lethbridge: thence west to Fort McLeod and the Old Man river. Nothing particularly interesting occurred on this trip across the plains, which covered about two hundred and fifty miles. In the diary which Dr.

Dawson advised Joe to keep and which Joe himself has christened the *Diary of a Greenhorn*, I find many details of the journey, a few of which I give here.

JUNE 25, 1883

"About five o'clock we came up to a freighting train composed of four sets of wagons, three in each set, and each set drawn by six span of mules. We had already seen it in the distance from the top of the Ridge and I had also had a distant view of an ox-train at Maple Creek; but this was the first time that I had seen one close at hand. The appearance of the three great covered wagons, *prairie schooners* graded from first to last, the long string of mules, the mode which is adopted of driving the front mule with one line, while the driver was riding on one of the hind mules, all was strange to me and attracted my attention for some time. George Weston guards us and the horses to-night and has orders to wake us at half past four in the morning."

JUNE 26

"This morning I rose at 4:10, the Doctor and the others being up a little before me, and we were able to get off by 5:50. We camped for lunch at 9:10 in Kipp's coulee and I rode up the creek to look at some exposures of shale and sandstones, giving me a ride of about ten miles. Saw a coyote near the creek. Left at one o'clock and at 5:30 camped near a party of Blood Indians from whose reservation we are not very far away. Four of them came over to see us and favoured us with their company part of the evening. Went to sleep amidst a chorus of frogs and bitterns outside, mosquitoes singing inside."

JUNE 27

"Rose early, four o'clock. Breakfast. Baked dough, pork, tea. Off by twenty to six. Travelled over a grassy plain which, at first, was cool and refreshing: but, as the sun rose, became hot and glaring, the air very oppressive, almost stifling us: and, as we drove along in the wagons, we'd fall asleep for a few minutes: then came a rude wakening, as the wheels bumped into some gigantic rut cut out by the prairie schooners. The wind, rain, and sun are changing my colour and flattening my countenance.

About half past ten we arrived at Coal Banks, in the bottom of the valley of Belly River, the sides of which are about five hundred feet high at this point. The valley looked very beautiful to us as the trees which cover the flats are the first we have seen for about three weeks. The town consists of three houses and half a dozen tents. Here there is a good ferry across the river. We tried to purchase some provisions but only secured some sugar, dried apples and baking powder: these were added to our breakfast, though the last was added first. The river here flows rapidly, and, beside us is a thicket of poplar, green grass, and altogether it is a pretty spot: air warm and dry, no mosquitoes. They are building a steamer here now but it will have to do well to make headway against this current."

JUNE 28

"Wakened at 4:20. Got started at 6:35 in the direction of Fort McLeod. I hope there will be some letters for me. It is now four weeks since I have heard from friends. We travelled till noon, had lunch, travelled till six at night, camping at the mouth of Rocky coulee, half a day's journey from McLeod. At noon I collected and pressed a number of plants and this evening I collected three or four more

in the bottom of the coulee. A few Indians camp near us. Came over and begged for tobacco."

JUNE 29

"Reached Fort McLeod or rather we are camped just across the river, in full view of the great city. It lies in a very pretty valley, partly wooded, at the junction of Willow Creek and Old Man River, and no doubt will yet be a considerable centre. No letters for me, but may expect some to-morrow. Dawson went across to find out. Had a bath in Willow Creek. To-night we fall asleep not to the bark of the coyote, but to the bugle call of the Mounted Police who are stationed across the river at Fort McLeod. Dawson got me a 12-bore shot gun, which will be much more effective in obtaining prairie chickens than the small bore guns we have had hitherto. The night is lovely, cloudless sky, millions of stars."

JUNE 30

"Obtained a pair of saddle bags, which will relieve me of the necessity of wearing a coat. We are busy getting things ready for our journey through the Rockies. We passed through Fort McLeod to-day, having ferried our stuff across the river, and it took us just seven minutes to pass completely through the town. I must say it shows great individuality, for every one has just built his house where he liked and throws all the refuse from said house just where it pleases him. The day has been taken up in running to and fro to the town. Some mail to-night."

After leaving Fort McLeod the party headed west for the mountains, calling on the way at Garnet's Ranch, where four brothers had de-

cided to try together the pleasure of attending cattle at the very foot of the Rockies, preferring that to making a precarious living in crowded cities. They camped one night at Garnet's place and had dinner at their house—the best house the party had seen since leaving Brandon.

JULY 6

“We begin our trip through the Crow's Nest Pass to-day. On rising we set to work getting our dunnage all sorted: and it was wonderful how much one could leave behind and then have apparently plenty of change for a month. All my clothes and blankets go in one bag. Then we spent an hour or two soldering the teapot, then wrote letters which Mr. Garnet will post: and then dinner was ready.

After dinner I put a few things into my saddle bags and set out on foot into the foothills to make a *pace survey* of the Crow's Nest Pass. It will be on the whole the surest way to see the mountains; but I think I will have the disadvantage of being separated from the rest of the party and so will not be able to converse with those who are old mountaineers, except at meal times.”

From this it will be seen that Joe, following Dr. Dawson's instructions was selected as being big and tall and strong and also perhaps a green-horn, to make what is known as a *pace survey*. That is to say, he kept track, by walking, of the distance travelled each day: counting the number of steps taken and multiplying this number by the average length of his step. Dawson, in his fatalistic way, told him of his duty, and left

him to his own devices, giving him no hint as to the best method to be employed, but leaving all to Joe's ingenuity. Perhaps it was the best way in the end. Joe, after some experimenting, decided to use the Roman pace, from left foot to left foot, a thousand of which, *mille passum*, made the Roman mile. Joe's single step averaged nearly two feet eight inches, so that, after some practice he acquired a steady habit of walking at this rate. It is a long stride, longer than the Roman soldier's; but Joe has long legs and a steady swing acquired by his military experience. The Roman soldier's pace is, according to the latest authorities, 4.85 feet, while Joe's was nearly 5.28: 5,280 feet to the mile. As he had no counter or mechanical device to assist his memory or take its place, he invented various methods of his own for counting tens, hundreds, and thousands, generally using little sticks which he transferred from one pocket to another. His counting was done according to primitive methods, but in a few days he had reduced it to a science, and he found afterwards that his survey was fairly accurate. His direction he took with a compass carried in his left hand.

The camp rose at daybreak, Joe a little earlier, in order that he might get well ahead of the party on horseback, which usually caught up to him at noon. After a short stop for lunch he started on again, the horses would pass him in the

afternoon, and it would be well into the evening before he reached the place where the party were camped. Sometimes, however, when he was a little late in starting, the horses would pass him early in the day: and falling far behind by dusk, he would have to drop the survey and rush on to camp, and then rise much earlier the following morning, go back on the trail, and complete the survey left unfinished the previous night. Dawson paid no attention to this: Joe was given a certain piece of work and was expected to carry it out, tired or not. The little doctor had no compunction about travelling past Joe, even when he must have known it meant a great amount of extra work the following morning. Rain or shine, hot or cold, he always drove his horse and train a full days travel. And so Tyrrell walked on, day after day, like a Roman soldier, until the task became a habit: he even grew to like the work: and was glad at least he was becoming a pedestrian of whom even Cæsar would have been proud.

In addition to his duty as a surveyor he was expected to make a collection of plants, ferns, and other natural objects which were strewn across his daily path. He was also supposed to look for mineral deposits or oil: and take a shot at any game which would increase the supply of food, now beginning to run short. When he reached camp at night, and had supper, Dawson

suddenly became another being, talking over the day's proceedings, asking Joe questions about various incidents which had happened through the day, discussing questions of geology, pointing out to him various formations which he had overlooked and helping him to identify the plants which were pressed each night and, stored in proper books when dry. No one could have been more sympathetic or interesting from an intellectual point of view, than the same George Dawson, who had passed him, perhaps, that afternoon without a word of welcome or encouragement. Then, next day, the same order of things prevailed and Dawson passed him on horseback without a nod or smile. He was a strange mixture, but before they had left the shadow of the Rockies, Joe Tyrrell had learned more Geology from him than he had ever known before.

Besides his other duties, Joe was advised, in fact, almost compelled, by the little geologist, to keep a diary, which he had to write up each night, when all was quiet in camp, and the day's work was done. And, to cap the climax, occasionally he had to act as sentry with a rifle on his arm, from dusk until dawn next day.

The trail over the Crow's Nest Pass had been well travelled for many years, and the party had no difficulty in getting through; for although it was covered with broken stone in places and

often crossed by shallow creeks there was good walking for man and beast. For many days Joe plodded on alone, starting in the morning long before the others so that when they caught up to him it would be time for lunch. The afternoon was a repetition of the morning, except that at night he usually had to walk several extra miles in order to catch up to the party on horseback.

In his diary he speaks of the wonderful scenery which he saw along the Pass at every turn: wooded valleys in many places, the peaks of the Rockies stretching upwards, one over the other, in the background many of them white with snow. Sometimes, he would strike off from the trail sideways and climb some high peak in order to get a better view of the country: this, however, meant several extra hours walking at night, with the chance of losing the road in the darkness.

JULY 9, 1883

Crow's Nest Pass, Elevation 4,438 feet.

"In the morning I went back on the trail for about half a mile, to connect with the survey of yesterday, while Dr. Dawson went up a creek to look for coal, some of which I had seen in the gravel bed of the creek. The lunch point to-day was given out at breakfast as Crow's Nest Lake, which I reached about two o'clock in the afternoon and was pleased to find that Dr. Dawson had decided to camp the rest of the day at that stop, in order to explore a wonderful cave in the vicinity. I went over with him to see it and we

spent the afternoon there. There was a grand gateway at the entrance like that from some huge Norman Cathedral, with a clear floor of crystal water which wells up at the back. One dry passage about four feet high leads back one hundred feet and then drops under the water. Old Indian devices in colour were to be seen on the threshold and over the entrance to the passage and on the other side of the main entrance over the water. It seemed to have been lately inhabited by bears and marmots."

JULY 10

Crow's Nest Lake.

"For a couple of miles the trail runs along the steep edge of the Lake, and here I collected a number of interesting fossils. Lunch in a little valley where I sorted out and changed the papers on some plants: then started off up a little valley with mountains to right and left of me, then turned South, and entered British Columbia in the midst of a beautiful wooded country where I shot a blue grouse with my revolver, which we afterwards had for supper. Mosquitoes bad here, air has grown warm. The bush is the finest I have seen on the trail; pine, spruce and poplar. My hands are swollen to twice their natural size from the stings of insects. Tried the rifles to-night and turned in under my blankets to sleep for the first time on British Columbian soil."

JULY 11

"This morning we started off from camp, Dr. Dawson riding alongside me for about two miles to Michel Creek, from which point I walked on alone. The outfit, on account of trouble with the packs did not catch up with me until noon, when we lunched in a very poor place, but still with water. In the afternoon we went on to the forks of Michel Creek, where coal was reported. On arriving there

on foot I found that I had left my hammer at the lunch camp and was obliged to ride back for it, thus getting the first ride that I have had on this trail yet. On getting back to camp at seven o'clock supper was ready and afterwards we amused ourselves by burning coal which is found here in the creek."

JULY 12

Michel Camp, B.C.

"In the morning we investigated the coal seams here. I found one about three feet thick near the forks, a fine bituminous coal, evidently first quality gas coal. I collected flowers also in the swamps and pressed them in camp. After dinner two parties passed us on the way to Kootenay and a little later we started after them. We went up Michel Creek and over a height of land, about a thousand feet high, into the valley of Coal Creek where we camped for the night, a dreary place. Graydon shot a woodchuck which we had for supper; not bad in flavour but exceedingly tough."

JULY 13

Coal Creek.

"It was late when we got up this morning, nearly six o'clock; but I got off on my walk about eight, ahead of the rest, giving me a good start. They were late catching up, as the way had been rough and stony and the packs kept slipping off the horses, so that they did not reach me until nearly two. I myself had stumbled on, stopping to take a bearing here and there or climbing mountains to get a better view of the trail, until my boots were almost torn off my feet. It was the shortest but hardest morning I had yet. After lunch the horses refused to be caught, and it was between four and five that we got again on the trail. Crossed to Elk river and camped for the night. A most gorgeous view from here. Fires are burning in the dis-

tance and it is beginning to get smoky. But there is not much danger from the fire, as the country all around has been burned over dozens of times. It is frightful to see so much fine timber gone, rampikes standing in millions all over the country: an incalculable number of cords of wood destroyed through carelessness. We have so far travelled whole days through forests almost entirely destroyed by fire."

JULY 14

"To-day we got into the middle of the fire, which is burning on both sides of the river, trees falling constantly with a noise like thunder. We camped in the valley of a creek running into the Elk, in the middle of desolation, every green thing destroyed. The thermometer fell one degree below freezing last night."

And so the story runs on. Days of toil, intermingled with the trivial details that occur on most exploratory work: coal seen, a bird or animal shot for dinner, blackened stumps, wonderful view of the mountains, streams rushing in narrow channels between perpendicular rocks hundreds of feet in height; wading through shallow creeks full of gravel, rock, and boulders of every size and shape. Black flies all day, mosquitoes all night: sometimes clouds of sand-flies, to make a most unpleasant change.

On July 20th they reached Kootenay (sometimes spelled Kootenie), where there was a store, stable, a ferry boat, and two wigwams, one empty; but they were glad to get back even to

such a crude civilization. A settler named Galbraith lived twelve miles from here: so Joe rode over to see him while Dawson went to inspect some mines. Galbraith had a good dwelling house, storehouse, barn, and a sawmill, near a swiftly flowing stream. He had prospered exceedingly and had been in the country thirty-seven years. Joe had a fine dinner at his house, meat, fresh vegetables grown on the spot, pie, cake: a pleasant change from pork and beans.

From this place the party started back for the North Kootenay Pass, taking the old Montana trail. On July 26th they reached the summit of the Pass, on their way East across the mountains. The elevation at that point was 6,760 feet, and there was plenty of snow all round them: in fact, at lunch that day, Joe, in his diary, tells of sitting by a snow bank, eating beans and drinking tea made with snow water. The thermometer fell one degree below freezing point that night and next morning they washed in snow melted by the fire about which they stood shivering until breakfast was ready. The following day was worse, owing to the absence of wind, the thermometer in the morning showing eight below freezing, their towels being frozen stiff. Several nights, on this Pass, they were forced to sleep out, *sub Jove frigido*, as no poles were available for the tents; snow all about them, but the temperature moderated by a south wind. On

the way down the Eastern slope of the Pass Joe was deputed to make a *pace survey*: and so again, like one of Cæsar's soldiers, he marched on alone from day to day. On one of these pedestrian excursions he found another seam of coal, but was unable to determine either its thickness or its quality. Finally they reached Garnet's Ranch, and so ended the month of July.

On August 3rd the party started for the Livingstone Mountains, to the north, the summit of which is 5,800 feet, reached on August 10th, Joe again making a pace survey on this trip most of the time, although he had the pleasure of horsebackriding on the prairie. This trip was colder at night, the thermometer frequently dropping several degrees below freezing; but the meals were much better, Joe's revolver doing good work and supplying the party with all the partridge they could eat, while Dr. Dawson contributed rainbow trout taken from every stream they crossed. In addition, they had service berries and blueberries for the picking, nearly all the way. Retracing their steps on this trip, they reached Garnet's Ranch again on August 16th.

Shortly afterwards the party started out to make another and final circular tour of the Rockies by the South Kootenay Pass, thence north on the west side of the Rockies, and back across the mountains by the Kicking Horse Pass. On August 21st they camped at Pincher Creek,

where they bought some more supplies, tea, sugar and salt: then struck south to the Waterton river, a branch of the Belly: and, on August 26th they reached the summit of the South Kootenay Pass, elevation 7,100 feet. On August 28th, they made camp in the State of Montana, across the boundary line, close to the Flathead river in what is now Glacier National Park. Joe had some great revolver practice in this region, shooting as many as a dozen partridges at a time. There was also other game, small and large, beaver, bears and deer. In his diary of August 28th he says, with regard to this section of the country:

“This is by far the finest hunting ground we have yet seen, the valley filled with fine timber, a lovely river full of fish, and plenty of deer everywhere. A shanty could be built here in a couple of days, provisions got in without difficulty from McLeod, and a hunting trip could be had in the Fall as fine as could be had in America.”

They reached the Kootenay valley on September 2nd and passed a small store, kept by two old squaws, one with but one eye. The store consisted of one room which was the whole house. Outside, an Indian was loafing about and a great Crane was strutting to and fro on guard at the door. Around the store was a small area of land, one field tilled, in which two Indians were loading grain on the back of a pony. There was

nothing to be had at this place, so they struck onwards till they reached the Kootenay river and passed an old house on the boundary line between Canada and the States: there they succeeded in getting their latitude. Then they proceeded to the old mining camp on Wild Horse Creek, which consisted of a narrow street with a line of huts on each side, hung on the side of a rocky hill, half way between the top and the river. Rosebushes and snowberries were in abundance at this village, giving a very pleasing colour effect and a good impression to the passing traveller. One store, kept by a man named Mayther, was quite a pretentious place. There was also a blacksmith at the Creek who shod their horses.

Shortly afterwards they reached the house of their old friend Robert Galbraith, where they were welcomed, and got a supply of fresh meat and vegetables. A few days were spent in the neighbourhood, Dawson wishing to learn something of the Kootenay language from some of the Indians in the vicinity. Here they bought from Galbraith sufficient supplies to take them back across the Kicking Horse Pass to Calgary, from which point Dawson intended to go home, as they were informed at Galbraith's that the railway was laid as far as that town.

Soon the country began to look like Fall, the wild ducks and geese already on their way south,

the leaves of the poplars turning from green to yellow, even the sky having a deep blue autumnal tinge.

SEPTEMBER 12

"We rode across a flat open space, wooded, and on rising over the slope of a hill, the Upper Columbia lake lay before us, the headwaters of the Columbia river. We took the level of the lake which proved to be fifty feet below the Kootenay. A fine scene at this camp: snow topped mountains and the Columbia river in the distance. Thermometer at seven below freezing in the morning."

On September 21st they reached the Kicking Horse Pass, on their way back across the Rockies, and were expecting a reasonably good trail through the mountains; but they were soon disappointed. In fact the Kicking Horse Pass was nothing but a sheep trail, fit neither for man nor horse: narrow, rough, circuitous, often running beside high rocks with perpendicular cliffs dropping to the river below. Day after day their lives were in danger, as may be seen from the following note from Joe's diary.

SEPTEMBER 22

Kicking Horse Pass, elevation 5,330 feet.

"We rode all day along a narrow path on the side of a hill 600 feet above the river, where a single false step would have sent horse and rider down to the bed of the stream, the trail for most of the time being angular rock and small boulders, on which a horse could hardly get a foothold."

Joe speaks of the fine view of a glacier in a valley through which a stream ran into Kicking Horse river. It was the first one he had ever seen and he was much impressed with this formidable exhibition of Nature. Two of them, side by side, appeared like huge masses of snow in the distance, covering an immense area, one rough, the other quite smooth.

They camped at Glacier mountain that night and reached the summit of the pass, Kicking Horse Lake, next day: afterwards descending into the valley of the Bow river.

SEPTEMBER 28

"In the afternoon we pushed on to Bow Park, the first open piece of prairie of any size on the way down. Here we found a number of log houses built to prepare for a mining camp, for several good mines have been reported from the mountains. We camped on the edge of the woods near a temperance saloon where beer and painkiller seemed to be the principal drinks. We passed another place further on, two or three stores, two saloons, and a Billiard Parlour which had sprung up over night, due to the advance of civilization by rail to Calgary. I went over to see the Parlour but found everything quiet except a man shouting the numbers on *Quino*."

OCTOBER 1

"I made a pace survey to the railroad which has now reached Calgary."

OCTOBER 2

"Dr. Selywn dropped in to see us to-day. He has come to Calgary to inspect some coal formations."

OCTOBER 13

“At Calgary in the Calgary House, the hotel of the town. It is full of guests, but we put two beds in a tent close by and slept well. Went to the railway station with Dawson’s baggage, and bade him goodbye. He is off to Ottawa. To-night I am going to have a real room, with solid walls, a door, and shall sleep between clean sheets. The town is full. I met W. F. King of Ottawa and Douglas Armour, and a lot of others. I am going to McLeod to get our stuff as soon as I can. There is no stage until the 19th: so I am going to ride down on horseback to-morrow, then return here with our stuff and take the train home.”

Joe eventually carried out his proposed plan, rode to Fort McLeod, returned, and took the train to Ottawa, which he reached on November 14th, in time to meet the numerous surveyors and geologists who swarmed in from all parts of the Dominion, and spent the winter months preparing their reports and maps, swapping stories, grouching about their small salaries, and in making preparations for the Springtime that they knew would surely come again.

CHAPTER IV

DINOSAURS AND COAL

THE seasons of 1884-5-6 were spent by young Tyrrell in investigating the geological formations of that portion of the North West Territory lying north of Calgary and east of the Rocky Mountains. Although then only twenty-six years of age, he was appointed by Dr. Selywn to take charge of an important expedition which was to pay particular attention to the coal deposits of that region which at the present day are of such great importance in the development of the surrounding country east of the Rockies.

He accordingly, left Ottawa on May 12th, 1884, reached Winnipeg on May 21st, and Calgary on May 24th. Here he bought a buckboard, five horses, a canvas boat, tent, blankets, and a supply of food. He also carried several rifles, shot guns, and revolvers. The instruments used for surveying consisted of a prismatic compass, odometer to be attached to the wheel of the buckboard, tape line, watch, aneroid, sextant and artificial horizon. To drive the team, do the cooking and chores, pitch camp, three men were engaged, two half-breeds, named Cook, and a

man named Fitzpatrick, who had been in the American army of the West.

The country to be examined was between the Bow River and the Saskatchewan, in what is now the province of Alberta. In a general way it lay between north latitudes $51^{\circ} 30'$ and 54° : longitudes 110° and 115° west of Greenwich, embracing an area of about 45,000 square miles. The Canadian Government had adopted a regular system of survey for Manitoba and the North West Territory, consisting of meridian lines, run every fourth degree of longitude, between which base lines, nearly parallel to lines of latitude, were to be surveyed about twenty-four miles apart. Between these base lines township boundaries were to be surveyed, forming blocks six miles square, after which the included townships were to be subdivided into unit sections, each a mile square. The surveys on this system had been begun, some of the base lines, as well as some of the township boundaries had been run; but no comprehensive maps had been prepared, and the maps with which Joe was furnished were based on a map made in 1813 by David Thompson,¹ the old astronomer, surveyor, and fur-trading partner of the North West Company, with additions by Palliser and Hector in 1857-1860. It was therefore necessary for him, while making geological investigations, to do his own

(¹) The figures in the text refer to the notes in the Appendix.

geographical surveying, a work requiring great care, patience, and accuracy, which the ordinary geologist was not often competent to undertake.

The party left Calgary, May 30th, on the trail which led to Edmonton, making a survey with the odometer, a little instrument which when attached to the wheel of the buckboard, registered the number of revolutions from which the distance travelled each day could easily be calculated.

From Joe's diary it appears that on June 9th, while inspecting some coal seams on Red Deer River, he was fortunate enough to discover bones of *Dinosaurs*, the first remains to be found in that vicinity, which has since become so famous, not only for its great coal mines, but also as a hunting ground for *Dinosaurs*. The spot where these fossil remains were first discovered lay just south of latitude 52° , in what is now section 10, township 39, range 21, west of the fourth Meridian.

The next day, going down the river, he found more *Dinosaur* bones, mostly on steep hillsides east of the river, a short distance above the point where the Knee Hills creek enters the Red Deer. From his diary of June 12th it appears that, while passing the site of the present town of Drumheller, where now many thousands of tons of coal are mined annually, he landed on the north side of the river, examined and measured seams of coal outcropping there, and took

samples from the thickest veins. This was the first time a white man had found coal at that place.

In all probability coal is now the most important product of this district, especially to people living on the plains; but the valley of the Red Deer is as well known to-day throughout the scientific world for its *Dinosaurs* as for its great deposits of coal.

Of course, no one has ever seen a *Dinosaur*, at least as far back as history goes, certainly not in action; but enough is known of them now from their skeletons to prove that at one period of the earth's age, monstrous animals, much larger than the largest elephant known, wandered about, some carnivorous like the lion and tiger, others herbivorous like the moose, and others, great amphibians, compared with which the alligators and reptiles we know at the present time are mere dwarfs.

On a subsequent trip to the Red Deer, Joe found, on the Knee Hills creek, a tributary of the Red Deer, the complete skull of a *Dinosaur*. Here are his field notes relating to that discovery:

“The next day, however, I walked up the bank close to camp, and at an elevation of between forty and eighty feet above the creek found a number of Dinosaurian bones in an excellent state of preservation, though very brittle. Most

of them were heavy and massive, such as those of the limbs, etc., but among these was a large and fairly perfect head of *Laelaps (Dryptosaurus)* *incrassatus*, a gigantic carnivore. We spent the afternoon excavating these bones from the rock, but unfortunately we had no appliances but axes and small geological hammers. We worked with all the care that the tools and the time at our disposal would allow, but in spite of all we could do some of the bones, teeth, etc., were broken. Then after we had managed to get them out of the rock, we had no proper means of packing them, and no boxes but the wagon box to put them in. However, we got together the skull and some of the best of the leg and other bones, and then found that we had a heavier load than we were able to carry with us. We were therefore obliged to leave a small pile of bones at the bottom of the bank just north of the creek, on the chance that we might be able to pick them up at a later date (which fortunately they were able to do two months afterwards when returning from another expedition). After completing this work, and packing up our precious collection as well as we could, we started in a cold drizzling rain on our way to Calgary. First we were obliged to climb up to the top of the bank of the valley, and it was so steep that with three horses we were not able to haul up much more than the empty wagon, while the fossil bones that

we were able to take with us were packed up to the top of the banks on the backs of the horses.

Our journey to Calgary took us a week, for we were obliged to drive slowly and carefully, both on account of having the poor spruce axle in the wagon and because we were anxious not to jar the brittle Dinosaurian bones any more than necessary, though the riding could not be made very easy, since our course for the most of the way was over the rough unbroken prairie, and not on a road or trail. Our regular geological survey of the country passed through was also carried on as usual, for an exploring geologist rarely ever has the opportunity of seeing a particular place or tract of country twice." This survey included an examination of the banks of the valley of Knee Hills Creek from our Dinosaur camp upwards, for they furnish an excellent series of sections of the Edmonton and lower Pascapoo rocks. While making this examination of the valley, and when at a point about five miles above Dinosaur camp, they found one end of a large limb bone, the piece preserved being twenty-six inches long, four and a quarter inches across the middle of the shaft, and eight and one half inches across the end or head.

Since the day when young Joe Tyrrell first found *Dinosaur* remains near Knee Hills Creek, hundreds of explorers from all parts of the world have travelled through the same valley and

searched for other traces of those great animals. Many fresh discoveries have been made, thus adding to our knowledge of the prehistoric condition of the earth's surface, but little or no credit has ever been given to the man who first discovered the hunting grounds of the great antediluvian monsters who roamed about, millions of years ago, in the fertile valley of the Red Deer.

It was while searching for *Dinosaurs* one fine evening that Joe rode up within a hundred yards of a herd of twenty buffalo, grazing in a little valley beside a creek: it was probably the last herd that came north into Canadian territory.

JUNE 18

"Started early and rode down to Berry creek where we camped. The road to-day was a dark loam and the feed good (for horses). Made 55 miles to-day."

JUNE 25

"Are out of wood, so have to hurry on north to reach the poplar."

JULY 1

"Reached Battle river, about 40 feet wide and swiftly flowing, running in a valley a mile wide. Grass on the north, wooded on the south. This evening Fitzpatrick had eye seriously injured taking a shoe off a kicking horse."

JULY 3

"On the trail to Edmonton again. Some potatoes that we saw on the way were quite as far advanced as they would be in Ontario. Grain looking well. Heavy frost last

night. Temperature 39° F. Coal reported four miles from here, a 3 ft. seam, at Black Mud creek."

JULY 6

"Reached Edmonton and started back to Calgary."

JULY 14

In Calgary.

"Since we first left this place we have travelled by odometer measure 628 miles, have made a track survey of the Red Deer River from the Crossing to the mouth of the Rosebud, and have examined considerable country, 150 miles on horseback. Packed specimens and sent them to Ottawa, shipped skull of *Dinosaur* to Philadelphia for examination. Got supplies for next trip."

From his field notes it appears that he made the trip to Edmonton, studying the geology of the country on the way, and was back in Calgary on August 22nd: started out again on August 24th and was back on October 26th, when he packed his material and left for Ottawa on October 30th.

In 1885, the year of the North West Rebellion, the same ground was covered and much valuable information obtained, of too technical a nature to be given here, but invaluable to the man of science. Among his other trips he descended the Battle river in a canoe, making a survey of its crooked channel.

In 1886, his survey was completed, as he was fortunate enough to secure the services of Mr.

D. B. Dowling who acted as his assistant during the summer. This survey lasted longer than the previous ones as the party undertook to travel in a skiff down the Saskatchewan river from Rocky Mountain House to Fort Pitt, and to return by the trail, which ran from that place to Edmonton, a distance of 174 miles.

The party left Ottawa on May 6th and reached home again towards the end of November. They were unfortunate enough to obtain horses which were balky and wild on the trail, giving them endless trouble and wasting much valuable time. In addition, all through June, July, and August they were pestered with flies, which became so thick and increasing in their action that Joe was forced, in order that he might forget their attacks, to study their habits and tabulate their hours of activity. In one section of his diary I find the following menu card:

Blackflies	6 a.m. till noon
Deerflies	8 a.m. till dark
Bulldogs	10 a.m. till dark
Peace	8—9 p.m.
Mosquitoes	all night.

CHAPTER V

NORTH WESTERN MANITOBA

ACCORDING to the recent map issued by the Dominion Government the province of Manitoba or, as it was originally called, Manitobaw, contains about two hundred and fifty thousand square miles. It lies between latitude 40° and 60° , longitudes 95° and $101^{\circ} 30'$, and includes a large triangular area which stretches to Hudson Bay, and contains what will soon be the town of Fort Churchill, the terminus of the Hudson Bay Railway; whereas, in 1887, when J. B. Tyrrell was sent by the Geological Survey to examine the geology of its north western section, it was comparatively small and unexplored, its northern boundary lying south of latitude 53° , inclosing an area of only seventy-four thousand square miles with a total population of not more than 150,000.

At that time Winnipeg had a population of about 25,000: Brandon, 5,000: and Portage la Prairie, which lay in the heart of a rich agricultural district, only 3,000 souls. The greater part of the province, outside of these towns, was inhabited by Indians who had reserves in various

places, and by half-breeds, some British but the great majority French. The thickly wooded areas of the Duck and Riding mountains lying to the west of lake Winnipegosis were the favourite hunting grounds of the Indians who had their reserves beside the small lakes or on the banks of the Assiniboine. Numerous posts of the Hudson's Bay Company were scattered all over the province, convenient for the sale of goods to the native population and the purchase of valuable furs.

Tyrrell spent the best part of four seasons, 1887-90, in the region west of lake Winnipeg, now served by a branch of the Canadian National Railway: and his Report for those years is a most valuable contribution to science and to economic geology. The section of the country examined by him reached from latitude $50^{\circ} 47'$ to $53^{\circ} 19' 30''$ and lay between longitudes $98^{\circ} 40'$ and $101^{\circ} 56' 30''$: an area of 25,000 square miles, whose surface drainage finds its way into Lake Winnipeg and thence down the Nelson River into Hudson Bay, by three discharge systems, which, however, are quite distinct and widely separated. The northern portion is watered by the great Saskatchewan which carries the snow waters of the Rockies through Cedar Lake directly into Lake Winnipeg, after a journey of seven hundred miles: while, one hundred miles south, Lakes Manitoba, Dauphin, Winnipegosis drain into

Sturgeon Bay: and at the extreme southerly end of the lake, the Red River, fed by the Assiniboine, carries the overflow of the remainder of this great region, which is most interesting to the scientist on account of its peculiar situation and the position it occupies in the geological history of North America, in connection with the ice age. For it is definitely established now that Manitoba proper was formerly covered by a great lake, named by geologists *Lake Agassiz*, in honour of Louis Agassiz, the first great exponent on this continent of the force of glacial erosion, and of the former distribution, over the northern portion of America, of a great ice-sheet during the glacial period.

This lake gradually became lower through the lapse of time, leaving behind it the lakes of the present day (which are mere shallow depressions) and the high hills of the Duck and Riding Mountains, whose elevation above the present lake levels is nearly 2,000 feet. Underneath the surface of the whole country lie beds of sand and shales of the Cretaceous age: lower down is the original rock of white Devonian, Silurian and Ordovician limestone.

Generally speaking, Joe's field notes show that, apart from geological and mining features, the country he surveyed was adapted for mixed farming, being well supplied with water and, for the most part, underlain by a clay soil derived

from the degradation of the soft limestones and shales of the Cretaceous beds to the west, and greatly enriched by the abundance of phosphatic material supplied by large deposits of fish remains included in these beds. He also saw much fine timber in places, although he reported that, as at the present day, much was being destroyed by fire. The lakes abounded in fish, and there was abundant game throughout the district, especially moose and cariboo. The climate was remarkably clear and fine, with frequent showers of rain in summer followed by drier weather in the autumn months.

His first journey into what was then an unexplored region began on July 15th, 1887, when he left Brandon and drove north by buckboard to Strathclair, and thence on the trail across the summit of Riding Mountain, down along the Vermilion river to Lake Dauphin, which lies in the midst of an alluvial plain about nine miles south of Lake Winnipegosis, into which it discharges by Mossy River.

Lake Dauphin is 26 miles in greatest length and eleven in greatest width; it has a shore line of 64 miles and an area of about 196 square miles. The name is associated with the earliest explorers in the North West, because Fort Dauphin, one of the trading establishments of the French, before the cession of Canada to Britain, was situated near the shore of this lake.

It was built in 1741 by Pierre Verendrye, who travelled from Fort La Reine (now Portage la Prairie) into Lake Manitoba and thence to Lake Dauphin. The Hudson's Bay Company once had a post there, the remains of which were seen by Joe, on the west side of the lake. Five streams empty into it, all of which were carefully surveyed. Thriving settlements of *Metis* were established on most of the streams.

During the remainder of 1887 Joe explored the Duck and Riding Mountains and the glacial valley between them as well as the numerous streams which water the country and drain into the Assiniboine. Sometimes he used a buckboard and wagon, at other times pack horses when the trail became narrow and rough; occasionally he had to travel on foot. The mountains, (or rather the one mountain cut in two by the great depression of Valley River), lie in a north-westerly direction forming a rugged ridge rising in different places from 1,300 to 2,000 feet above the level of Lake Winnipegosis. To the east they descend in a steep wooded slope to an even, almost unbroken, alluvial plain, which inclines gently towards the level of the lakes. To the west they descend much more gradually towards the plains. Over a greater portion of the higher lands the surface is dotted with beautiful little lakes of clear, fresh water, surrounded by small poplar and willow, while in the more

thickly wooded districts spruce trees grow right down to the water's edge. Many of these lakes are quite isolated, and overflow only in rainy seasons, being all of glacial origin.

In ascending from Lake Dauphin to Riding Mountain the surface is very level and rises by low steps to the foot of the more abrupt escarpment. The steps are occasionally replaced by ridges of rounded gravel: both the steps and ridges represent old shore lines of the ancient Lake Agassiz which formerly occupied the whole of the basin of Lake Winnipeg and the valley of the Red River, referred to already as Lake Agassiz. The most picturesque spot on the mountains was at Angling Lakes where a band of Indians under Chief Côté lived in winter, this spot being right in the centre of their hunting grounds.

The region about Duck Mountain is peculiarly interesting to the geologist, as it shows many traces of glacial action during the ice age. Joe's field notes are of too technical a nature to be given here but it may be said that, during the continuance of the glacial period, a huge glacier moved in a southerly direction in the great valley east of the Duck escarpment, while on the other side of it, to the west of the mountain, a parallel glacier flowed through the valley now occupied by the Assiniboine. At times these glaciers coalesced over the tops of the mountains and

formed one huge ice sheet, leaving behind them, when they passed on, huge boulders of all sizes and shapes, which have given the north eastern summit of the Duck Mountains their rough and broken character.

A special report on the Duck and Riding Mountains was issued by J. B. Tyrrell and published by the Geological Survey of Ottawa in 1888. This contained a summary of the work done during the previous year.

On June 13th, 1888, Joe left Winnipeg for Portage la Prairie, from which point he proceeded to Manitoba House, and thence to Fairford House, a Hudson's Bay post on the eastern shore of Lake Manitoba, in Portage Bay, where the lake drains by Fairford River and the River St. Martin (otherwise known as the Little Saskatchewan) into Lake Winnipeg. At the present day (1929) a branch of the Canadian National Railway runs along the east shore of Lake Manitoba and terminates at the settlement of Gypsumville not far north of the old post at Fairford House. It was when he was inspecting this section of country that Joe was taken ill with typhoid fever, and lay for two weeks in a canoe while his men paddled him back to Winnipeg. It was an entirely new experience for him and one that nearly cost him his life. He lay two months in hospital at Winnipeg until

the summer was gone, thus preventing the completion of his work west of Lake Winnipeg.

However, in the spring of 1889, he again returned to the field and ascended Rivers St. Martin and Fairford to Lake Manitoba, and Manitoba House was reached on June 8th, the season being spent in geological work and in making surveys of Lake Manitoba and the adjoining streams. The summer of 1890 was spent principally on the Assiniboine, down which he paddled in 30 days from Fort Pelly to Portage la Prairie, and on the Saskatchewan from Cedar Lake to its mouth, where it enters Lake Winnipeg.

A few of the most interesting field notes are given here, taken from his reports of 1889 and 1890:

“Lake Manitoba lies between latitudes $50^{\circ} 11'$ and $50^{\circ} 48'$, longitudes $97^{\circ} 56'$ and $99^{\circ} 35'$ and has a general direction North 25° West. It is 810 feet above sea level, has a total length of 119 miles, and is divided into two parts by a strait known as Sifton Narrows, after a man named Sifton who has had a trading post there for some years. The lake has an area of 1,711 square miles and a mean depth of about 12 feet, being but a mere depression in the great lacustral plain which covers most of the surrounding country, and is underlain by limestone. The only considerable streams flowing into it are White Mud

River at the south and the Waterhen at the north. The level of the lake varies with the rainfall and drought. On account of its shallowness, it is easily heated by the long summer sun, preventing early frosts in the neighbourhood. From the records of the Hudson's Bay Company at Manitoba House it appears that it freezes over about November 10th and opens completely by May 20th. To the north of the Narrows, about a mile and a half from the abandoned C.P.R. line, lies Manitoba Island. On the north end of this island is a cliff about 200 yards in length, and 12 feet high, composed of horizontal strata of hard compact limestone, a mixture of cream and pink in colour. The rock breaks into very irregular flattened fragments. From the foot of the cliff a beach 50 feet wide of these flattened pebbles, which ring like a bell when struck with a hammer, extends to the edge of the water. When the wind blows from the north, and the waves roll up on this beach, these resonant pebbles dash against one another, and a roaring sound is made which resembles the beating of a huge drum. Indian superstition has attributed this to Manito beating a drum, and thus that portion of the lake was called by them *Narrows of the Spirit* or Manito-baw. This name was afterwards applied to the whole lake, and thence to the province in which the lake is situated. For many years, 1870-90, the word was pronounced Manito-baw by the

English, as originally used, but gradually the accent fell back to the penultimate according to the custom of our language, and we have the Manitoba of the present day. The French, of course, still retain the correct Indian pronunciation, which is more in accordance with the euphony of their speech.

Lake Manitoba discharges by Fairford River into Lake St. Martin, which in turn discharges into Lake Winnipeg by the River St. Martin or Little Saskatchewan, designated on recent government maps as River Dauphin.

Lake Winnipegosis is long and curved, lying between latitudes $51^{\circ} 34'$ and 53° , longitudes $99^{\circ} 37'$ and $101^{\circ} 6'$. Greatest length 120 miles, average width 17 miles. Its shore line is 570 miles, and area, exclusive of islands, 2,000 square miles. Its greatest depth is only 38 feet, and its summer temperature from $60-70^{\circ}$. It is 18 feet above the level of Manitoba lake. It is fed by but few streams. Its drainage system is separated from that of the Saskatchewan by a portage at the north end, about four miles in length, which ends at Cedar Lake, the reservoir of the overflow from the Saskatchewan.

Cedar Lake receives the waters of this great river in the midst of an archipelago of small islands, on one of which Fort Bourbon was established in 1741 by some French *voyageurs*. It is 30 miles in length; its greatest width is 14 miles;

it has a shore line of 108 miles, and an area of 330 square miles. Its elevation above the sea is 828 feet. From it the Saskatchewan runs through Cross Lake and then discharges into Lake Winnipeg by the Grand Rapids, the most interesting geological feature of the great stream: for at this spot, the river drops 71 feet in two miles, and runs through a gorge which it has cut in the horizontal limestone, part being post-glacial and part pre-glacial in age. There is a portage at this rapid, made by the Hudson Bay Company; but sometimes a *voyageur* will be hardy enough to run the rapid throughout its length."

CHAPTER VI

LAKE WINNIPEG

FEW people, even those who profess to be familiar with geographical distances, have any idea of the magnitude of Lake Winnipeg.² If you ask any of your friends to tell you the dimensions of the lake, some of them will look blank and answer evasively, others will say that it is pretty big, probably about the size of Lake Simcoe: and a few will admit frankly that they know nothing about its size or situation. Yet it is the fifth largest lake in North America, having an area of 9,414 square miles, two thousand more than that of Lake Ontario, and only 500 less than that of Lake Erie. Its greatest length is 260 miles, and its width varies greatly, being about 60 miles at the northern end. It is 710 feet above sea level and has a general depth varying from 40 to 60 feet. (1890).

As previously stated, it is fed, on the west by the great Saskatchewan, and by lakes Winnipegosis, Dauphin and Manitoba: on the south by the Red River and the Assiniboine: and on the east by many streams, the principal ones being the Berens and Winnipeg River, the latter of

which brings the waters of "Lac Seul" and Lake of the Woods. All this immense drainage passes from Lake Winnipeg by means of the Nelson River, which discharges the lake at its northern end, into Hudson Bay.

Tyrrell spent the best part of three summers, 1890, 1891, and 1895, in the neighbourhood of this great lake: and his account of the work done is contained in volume eleven, annual report of the Geological Survey, not published however until 1900, when he was no longer in the service of the Canadian Government.

During 1890, after his journey down the Assiniboine, which ended on July 15th, he started across Lake Winnipeg to make a survey of Cedar Lake, near the mouth of the Saskatchewan.

His party, along with a sail boat designed by the well-known boat builder, Watts, of Collingwood, were carried from West Selkirk to Grand Rapids at the mouth of the Saskatchewan by the steam barge "Red River", and arrived at the fish packing station near Grand Rapids on July 25th. Next morning all baggage and goods were placed on a small flat car, and a horse pulled the outfit across the tramway three miles further up the river. At this point the sail boat was launched, and was taken up to Cedar Lake by a mixed process of sailing, poling, rowing, or tracking with a towline, according to the nature of the river bed and the velocity of the stream.

Joe made a survey, both geographical and geological of Cedar Lake: and, amidst the collection of geological and other details I find an occasional item interesting to those who know little about the structure of the earth's crust and its changes through countless years. For instance, while on Cedar Lake, an Indian showed him some pieces of amber which he had found not far from the west shore of the lake. Next day Mr. King of the Post accompanied him to the place where it was found and here is his account of this deposit:

“It occurs mixed with sand and many fragments of partly decayed wood, on a low beach behind a gradually shelving shore. The pieces are for the most part smaller than a pea but can be readily seen glistening among the sand and vegetable debris. Some pieces were found as large as a robin's egg, and Mr. King informed me that he had collected pieces very much larger.

It is difficult to make an accurate estimate of the quantity of amber on this mile of beach but it is found throughout the distance in a band thirty feet wide, with a minimum depth of two or three feet. A number of specimens collected from various parts of the deposit showed an average of ten per cent. amber, so that the amount of it in the sand would run to nearly one million pounds. This estimate refers merely to

the material washed up on the beach without considering the source from which it came.”

Amber is a curious substance, well known to the ancients, one of whom, Thales of Miletus, discovered its electric property of attracting small pieces of paper when rubbed with a woollen cloth. It is mined chiefly in East Prussia, being washed up from the sea near the promontory of Samland.

Its chemical composition is carbon and hydrogen, with a small quantity of oxygen. It has many uses, not only as a fine varnish when mixed with various liquids, but also for various parts of electrical instruments. Beads, cut in various shapes, are sought for ornament. A necklace of small beads made of a certain kind of clouded amber, is supposed to cure all kinds of diseases of the throat and thyroid gland.

Perhaps the most familiar thing about it is its use in the manufacture of mouthpieces for pipes. For this purpose large pieces of block amber are sought and cut down to suit the particular size and shape of the stem. Sometimes small fragments are heated and melted into a block; but a stem made from such a block has none of the original beauty of the natural unheated amber.

Melting the amber also destroys a valuable quality which the natural block possesses, that

of disinfection, which is totally lost by the action of heat.

It is a curious fact, but one well proved by experience, that a good mouthpiece of greenish-yellow clouded amber will cure all kinds of sores on the lips and destroy all those deadly germs which usually gather on stems of briar, wood, or clay. Pipe smokers please take notice.

After two weeks spent on Cedar Lake Joe returned to the mouth of the river, running the Grand Rapids instead of using the tramway for carrying his men and baggage around the two miles of white water. He speaks in his notes of the wonderful exhilaration of being tossed about on the surging waters of the grandest portion of one of the greatest rivers in the Northwest Territories. He measured the drop in the river and found it to be nearly seventy-one feet.

The rest of the season of 1890 was spent in coasting down the north and east side of Lake Winnipeg, Joe walking on the shore, where possible, taking photographs and making geological observations for future use.

In the first week of September the party had reached Warren's Landing near the Mounted Police patrol and, while in that vicinity, a great storm came up from the west and prevented them from going further. It was near here that Joe saw the police patrol boat sail out from amongst the Spider Islands and disappear in the storm,

afterwards being wrecked on a reef at Pigeon Point: two policemen were drowned, while Matthew Watts, the boat builder, who had lashed himself to the boat, was saved, only however to die in Winnipeg hospital a few days later.

At that time the gas engine was just beginning to be used commercially; but gasoline, as an explosive motive power, was unknown; and the sail boat was still the standard means of locomotion on the larger inland lakes, where steam power was not available or desirable.

Eventually, after much stormy weather and many adventurous trips along the rivers flowing into the east shore of the lake, Joe arrived at Selkirk on Wednesday, October 15th, just after the first heavy snow storm had set in, and at once left for the East.

In July, 1891, Joe started north once more from Selkirk in tow of the steamer *Sultana*, and the following day arrived at the mouth of the Berens River which runs into Lake Winnipeg from the east.

The summer was spent in exploration and survey of all the principal streams on the east shore, and in endeavouring to determine the extent of the schists and quartzites which might be profitably examined for the presence of ores of the richer metals, especially gold and silver. The report of the season's work is largely technical, dealing with the geological structures of the dis-

trict and describing the various formations which underlie the country to the east of Lake Winnipeg.

The Winnipeg River was surveyed for some distance and, on the return, a track survey made to Lac du Bonnet. The shore from the mouth of the Winnipeg River down to the mouth of the Red River was also fully explored. His work ended on October 3rd.

The most human incident I find in his large book of field notes containing hundreds of pages is his meeting with a man named Neison who lived near the mouth of the Bad Throat River, called by the Indians *Manigotagan*. The history of this man is most peculiar and interesting.

Born in London, England, he was educated as a civil engineer, and for some time taught in a scientific school near his home. In the early eighties he became engaged to a young lady whose people, however, objected to him on the ground of his being a Roman Catholic, and the engagement was broken. He then left London and took a trip to the western States, returning to London the following year to find his former sweetheart married: whereupon he again left home for America, and, after some wandering, arrived in Winnipeg.

When Joe first saw him in 1890 he was living with a band of Cree Indians who had a little settlement near the mouth of the Bad Throat

River, was married to a fine looking squaw and had given up all idea of ever returning to civilization. Unlike hundreds of others who had done the very same thing and got tired of life amongst savages, he kept his word, and remained with the band until he died about 1900.

For some years he took charge of the Indian school at Bad Throat, and endeavoured in every way to improve the band amongst whom he lived and with whom he hunted, trapped and fished, and travelled all through the North in search of game and furs. Joe describes him as a handsome, big, fair man, polite, obliging, civil: well educated, and an excellent draughtsman, supplying Joe with many maps of the unexplored district east of Lake Winnipeg.

He had several sons, one of whom, a handsome halfbreed, Joe met in 1925, as Captain of a steamer on Lake Winnipeg.

I notice also several items showing that Joe's hand was still steady and his judgment of distance unimpaired, although he had passed his third decade.

Here are two of them:

AUG. 13, 1891

"I shot a fine caribou a short distance below portage 15 on the Manigotagan River. I shall have the skin tanned, and the head shipped to the museum at Ottawa."

AUG. 14, 1891

"A short distance below portage 10, from a distance of nearly 500 yards I shot a fine fat bear,³ just as we were stopping for lunch."

After a hiatus of four years spent north of '55 Joe was sent in 1895 to examine that portion of Manitoba lying east and northeast of Lake Winnipeg, which was drained by streams flowing into the Nelson River. He arrived at West Selkirk on Saturday, July 13, 1895, and shortly afterwards engaged two of the men who had accompanied him across the Barren Lands, as canoemen for the summer. The following Wednesday his canoe and supplies were put on board the "City of Selkirk", which started down the Red River. Next afternoon, at 5 o'clock he was landed at Selkirk Island, latitude $53^{\circ} 20'$, longitude 99° , 12 miles northeast of the mouth of the Saskatchewan. On Friday they were towed about 20 miles northwest, after which they paddled around the north shore of the lake, and arrived at the outlet into the Nelson River late on Saturday night.

Entering the river, he made a survey of its first expansion, known as Playgreen Lake, and then proceeded down to Little Playgreen Lake, along the eastern channel of the river, finally arriving at Norway House, a well known post of the Hudson's Bay Company.

He then explored the country lying east of the Nelson, which was watered by the Gunisao River, and spent a week ascending this stream to its source: afterwards paddling down and returning to Norway House.

He was delayed here by stormy weather for many days but the time was spent in refitting the sailboat which he had used the previous year and which had been brought up from Winnipeg. It was known by the euphonious name of *Pterodactyl*, an extinct, prehistoric dinosaur with powerful wings, a massive head containing sixty-six teeth, long legs and huge eyes: able to walk, fly or swim.

Having made a survey of Little Playgreen Lake and the shore in the vicinity of Norway House, he sailed south and began examination of the eastern shore of Lake Winnipeg and the streams which entered there, in order to confirm or disprove some of his speculations of the previous year.

On the Berens River, which is the largest and longest of those streams flowing into the lake from the east, he discovered seven large pot-holes, relics of a glacial or pre-glacial age, when the waters of the river must have flowed in a direction opposite to that of the present day.

‘Potholes are remarkable formations made in the solid rock, and usually found in the immediate vicinity of running water, sometimes,

however, in spots far from any source of water, over which a glacier has passed in prehistoric times. They are cylindrical holes, varying in diameter from a few inches to four feet and in depth from one to ten feet or even more. The sides are usually inclined slightly to the vertical, but occasionally one is seen with straight sides.

Joe also found three potholes on the Blood River, south of the Berens, on the fourth portage: and further up, above the ninth portage, a large one, which had been bored in the side of a granite hill, whose surface was marked by glacial action. Several lakes were surveyed near the source of this river, and the return trip made down to Lake Winnipeg, which was reached on October 4th: and, as snow was beginning to fall, Joe left for Selkirk, which he reached on October 6th, and started for home on October 8th.

CHAPTER VII

TWO GREAT RIVER SYSTEMS

HALF a century ago, that portion of Canada lying north of the fifty-fifth parallel of latitude, was but little known except to a few prospectors and Government surveyors, and to a comparatively small number of Indians, half-breeds and inland Eskimos, who wandered from place to place, collecting furs and exchanging them for ammunition and clothing, tobacco, tea, flour and other luxuries of civilization at the isolated trading posts established by the Hudson's Bay Company on the main river systems which drained either into the Arctic Ocean or into Hudson Bay.

The fifty-fifth parallel runs an odd hundred miles north of the present city of Edmonton, crosses the Nelson river above Lake Winnipeg, passes through the upper end of James Bay and strikes the Atlantic Ocean between Hope-dale and Hamilton Inlet. North of this parallel lies a vast region, most of it still unknown and unsurveyed, although at the present day an increasing number of mining prospectors and explorers, both amateur and professional, are

rapidly opening up the country by availing themselves of the airplane, which has eliminated the canoe and the snowshoe for long distance travel, and is slowly but surely becoming the most important ally of the northern pioneer.

Public interest has also been aroused in the development of the region which lies northeast of Winnipeg, by the completion of a steam road to Fort Churchill (1929) lying on the west shore of Hudson Bay at the mouth of the Churchill River, in latitude $58^{\circ} 44'$: where the Hudson's Bay Company have had a trading post since 1717.

The vastness of the great region which extends north from the fifty-fifth parallel to the Arctic Ocean and from the Atlantic to the Pacific is not realized from an inspection of the ordinary maps of Northern Canada, which are usually constructed on a small scale, varying from twenty-five miles to two hundred miles to the inch. Seen on such a map, Hudson Bay resembles merely a great lake: whereas it is over a thousand miles from north to south and six hundred miles from east to west: so large, that the portion of the province of Old Ontario south of the French river, could be rolled into a ball and dropped into its waters without creating a ripple on its shores. It is, in fact, a great inland sea of salt water, with a tide varying from fifteen to twenty feet, with dozens of navigable streams

emptying into it, both from the east and west, whose waters, if properly controlled, could furnish unlimited water power to supply the surrounding district with light, heat, and energy.

The Churchill River which takes its rise from the south, near latitude 55° , flows northeast eleven hundred miles before it reaches the waters of the Bay. It has furnished one of the favourite canoe routes in the past, and the history of its navigation dates back to the time of David Thompson, the explorer and surveyor, who, in 1796, established a trading post on its banks near Lac La Loche, and made the first accurate map of the region. This is in manuscript form and is now in possession of the Crown Lands Department of Ontario.

Besides the Churchill, other rivers, much more navigable and much greater in volume, flow into the Bay both on the east and west shores, and from the south into James Bay: those on the east, however, are not as well known, on account of the difficulties of exploration which have hitherto existed in Northern Quebec, but which now are being overcome by aerial navigation.

In the summer of 1892 Joseph Burr Tyrrell was deputed by the government to explore the region which is bounded on the west by Athabasca River, on the south by the Churchill, on the east by Reindeer Lake and River, and on the north by Athabasca Lake and Stone or Black

River which drains into Lake Athabasca. He was accompanied on this trip by Mr. D. B. Dowling, also of the Geological Survey.

If you look at an atlas showing a map of this territory, you will see nothing but a little circular patch of coloured paper, hardly an inch in radius, which now constitutes the northern portion of the district of Saskatchewan. You could nearly cover it with a twenty dollar gold piece. But if you saw the same portion of territory on a large scale you would begin to think of it as a rather large piece of ground. You would see an oval shaped region bounded by the aforesaid rivers, and containing within its perimeter sixty thousand square miles. At the extreme northwest end of the oval lies Lake Athabasca, well known to travellers, on which is situated the trading post of Fort Chippewyan, latitude $58^{\circ} 45'$. To the west is the Athabasca River, on which is Athabasca Landing and Fort McMurray, two important posts of the Hudson's Bay Company. The southern portion of the oval consists of the Churchill River, which rises near the Height of Land known as Methy Portage, and flows east. On this stretch is the mission of *Ile a la Crosse* and Stanley Mission. The east side is bounded by Reindeer Lake and River, the lake being large and having an area of twenty-two hundred square miles. The mission of *Du Brochet* is situated at the mouth of the Cochrane River. On

the north lie Wollaston Lake, Black Lake and the Black or Stone River, draining into the Athabasca system.

To understand more clearly the nature of this section of land, it is necessary to remember that, north of the great country drained by the Saskatchewan River, there lies a vast region, drained by two great river systems: one the Churchill River system which flows east and north and empties into Hudson Bay, while the other, the Athabasca-Mackenzie system, fed by the Peace River and other great streams, carries its water northerly for nearly fifteen hundred miles into the Arctic Ocean at Mackenzie Bay.

Both these great river systems inosculate in Lake Wollaston, latitude 58° , which discharges its waters into both by almost equal streams. This fact was first noticed by David Thompson and is marked on his map; but was disputed by Abbé Pettitot who claimed there was but one outlet. A. S. Cochrane, of the Geological Survey, who travelled in 1881 over part of the oval river system just described, decided the question, finding that a river (called by Tyrrell the Cochrane in his honour) discharged from Wollaston Lake at the northeast corner into the Churchill system: while, to the west, the Stone River carried some of its water into Lake Athabasca.

The region, which Joe was called upon to ex-

plore and examine, lay between latitudes $55^{\circ} 20'$ and $59^{\circ} 37'$, longitudes 101° and $111^{\circ} 30'$. Starting from Prince Albert in a light wagon, he drove along what was known as the Green Lake trail, descending the Beaver River, a small stream flowing into the Churchill from the south and discharging its waters near Ile a la Crosse, where there is a large Roman Catholic mission and a fur trading store of the Hudson's Bay Company. Joe noticed at this place some ash-leaved maples which had been planted in the garden of the Post and were from fifteen to twenty feet high, with abundant seed.

It was from this Mission that he began his trip, engaging three canoemen for the summer, and proceeding across the lake on June 29, 1892. As it was impossible to cover the whole territory within the oval curve of the river systems in one summer, Joe sent Mr. Dowling to survey the south shore of Lake Athabasca: after which he was to examine the Reindeer Lake district; while he himself proceeded to investigate the river systems of the interior. On a map of twenty-five miles to the inch, the oval region comprised within these two river systems is seen to be divided into three sections by four streams, two, the Mudjatick and Foster flowing south into the Churchill from a height of land in the interior: beyond this height of land are two other streams, the Cree River running north into

Black Lake which drains into Stone River, and Geikie River flowing into Wollaston Lake. These four streams, each about one hundred miles in length, enclose an area of about twenty thousand square miles, the central portion of the oval space. This area had never before been explored.

Joe had difficult work on these streams, which were filled with heavy rapids and long portages, while the air was always filled with mosquitoes and black flies, at that time of year in all their glory. He ascended the Mudjatick and reached the height of land on July 12, crossed into the Cree River and descended it, although it was full of shallow rapids, where tracking with a line, poling or paddling was almost impossible. Some of the heavier rapids were two or three miles in length. On July 21 he reached the mouth of the Cree River where it empties into Black Lake, which in turn drains into the Stone or Black river, running west into the Athabasca system.

Black Lake is a long narrow body of clear water lying generally northeast and southwest, with a greatest length of forty-one miles and a greatest width of nine; a shore line of one hundred and ten miles and a total area of two hundred square miles. The latitude of the end of the southern bay is 59° : temperature of the water in July 59°F . It is a very beautiful lake,

in spite of its name, which seems to have been given to it by David Thompson, perhaps on account of the dark hills of norite which overlook its northwest shore. By the Chippewyan Indians it is called *Mouths of the Three Rivers Lake*, alluding to the Cree, Stone or Black, and Chipman rivers, by which it is fed.

It was on this lake that Joe first learned of the route to the Barren Lands, and across to Hudson Bay. When they were examining the north shore of the lake one of his Indians, at a point about two miles east of the mouth of the Chipman River, pointed to a spot in latitude $59^{\circ} 17' 34''$ where there were some everhanging willows and said that a portage ran from there to a canoe route, by which the Chippewyan Indians annually travelled to their hunting grounds on the Doobaunt River: adding that this river flows an unknown distance into the north, to the country of the Eskimos and the musk ox. Joe pondered over this information all through the rest of the summer and finally decided that the following year, if the Survey was willing to send him, he would make an attempt to cross the Barren Lands and descend by the river, called by the natives Telzoa or Doobaunt, to its mouth, whether it led to Hudson Bay or emptied into the Arctic Ocean.

He spent August and September meditating on this future exploration, while engaged

actively in surveying the northerly and easterly curves of the quadrilateral area, which now forms the very centre of Northern Saskatchewan. He surveyed Wollaston Lake on the north, paddled south, up the Geikie River to the height of land, and across to the Foster River, flowing into the Churchill: then turned west again to Ile a la Crosse, from which he had started. He arrived there on September 20, 1892, and left shortly afterwards for home.

His field notes of this comparatively short trip contain much valuable information of a geological nature, too scientific to be interesting to the ordinary reader, but of real interest to the mining engineer and prospector; a few extracts from them will give a general idea of the results of his survey. In the first place, the country examined, with few exceptions, was unfit for agriculture, but teemed with fish, notably trout and whitefish. There were also many forest trees, mostly, however, small black spruce (*picea nigra*), tamarac, and Banksian pine. One isolated group of white spruce was seen on a sandy island in Hatchet Lake, which lies between Black and Wollaston Lakes, in latitude $58^{\circ} 40'$. He also found plenty of poplar and birch. The common huckleberry and cranberry were found everywhere. Moose were plentiful, seven having been seen at different times, although no regular hunt was undertaken. The barren ground

cariboo apparently went in winter to the south end of the Reindeer River, near Frog Portage, returning north in spring. One was shot in July on the Cree River. The wildecat, or lynx, was plentiful. Grey wolves were seen, but were not abundant. The coyote is not common in the district, although Joe shot one near the source of the Foster River in latitude $56^{\circ} 40'$. George M. Dawson states that its northern limit is Athabasca Landing.

“Red, black, and cross foxes, wolverene, marten, weasel, mink and skunk are all found in greater or less numbers, in the rolling wooded country, underlain by Archaean rocks. The otter is found in all the streams. Muskrat everywhere, also red squirrels and chipmunks. Along the rivers ducks breed in vast numbers, but few land birds are seen. Loons and divers in all the lakes. Grouse and spruce partridge were found everywhere in the thick woods. Trout in the lakes, whitefish in the shallow lakes and small streams. Pike, pickerel, methy, (*lota lacustris*) red, grey, and black mullet, were found in all the streams and water stretches.”

The number of Indians was small, being centred chiefly about the four trading posts, Methy Portage, Du Brochet, Stanley Mission, and Ile a la Crosse. Those who trade at the last two missions are Crees, at the other two, Chipewyans. The total number is not more than

three or four hundred, about one person to every one hundred and fifty square miles.

Regarding the quality of the water in the lakes and streams the following curious fact is noted in Joe's field notes:

“The water of the Churchill is very much darker than that from the north and evidently contains much organic matter, as the shores show a greater profusion of aquatic plants, and the submerged surfaces of rocks bear an abundant growth of sponges and the smaller forms of algae. On the Reindeer River and lakes above it the water is clear, and the submerged rocks are bare.

A chemical examination of these waters was made by Dr. F. D. Adams in the laboratory of the Survey in 1882, and he reports that the water from Reindeer Lake is remarkable for the small amount of dissolved solid matter which it contains: in this regard it would take rank with the waters of Bala Lake in Wales, and Loch Katrine in Perthshire, Scotland.”

CHAPTER VIII

ACROSS THE BARREN LANDS

IN the Spring of 1893, having been authorized by the Director of the Geological Survey to make a trip across the Barren Lands lying to the west of Hudson Bay, Joseph Burr Tyrrell left Toronto on May 16, in company with his brother James W. Tyrrell,⁵ who was to act as his assistant, topographer, and Eskimo interpreter. He stopped a day or two at Chicago, to see the World Exposition: and arrived at Edmonton, the northern terminus of the railway, on the evening of May 22: and, having obtained supplies and men proceeded on the 27th by wagon on the trail to Athabasca Landing, one hundred miles distant, where he arrived on the 29th. Joe noticed, on this trail, the wonderful richness of the soil on both sides: a fine deep black loam, covered with clumps of poplar scrub and prairie grass. There were a few settlers here and there along the main trail. The trees were as much as fifteen inches in diameter. Further north the soil became more sandy.

The party reached the Landing on the even-

ing of May 30, having finished the first and easiest stage of the long journey.

Athabasca Landing is a picturesque settlement in the beautiful valley of the Athabasca River, and was the main point (1893) where all furs from the great northern country along the Mackenzie River were brought and stored. The Hudson's Bay Company steamer, the "Athabasca", ran from this port to Grand Rapids, a distance of one hundred and sixty-five miles. From here the cargo was carried for eighty miles in scows, and then the goods were transhipped to another steamer, the "Grahame", at Fort McMurray. This steamer carried the goods to Fort Smith on Slave River, where another portage of sixteen miles was made: and a third steamer, the "Wrigley", again took the goods and delivered them at various points along the Slave River, Slave Lake, and the Mackenzie, down to the Arctic Ocean, a distance of twelve hundred miles.

After many delays and accidents, the party arrived safely at Fort Chippewyan, making the trip in canoes from Athabasca Landing, a distance of four hundred and thirty miles, in a little over two weeks, from May 30 to June 18. Here they obtained their supplies which had been brought by the Hudson's Bay Company steamer.

Fort Chippewyan is an old and important post

of the Company, having been established before 1789, when Alexander Mackenzie started on his famous journey down the great river which bears his name. It is a picturesque post, and contained in 1893 about twenty detached dwellings facing the lake, at the east end of which, in a sort of courtyard, stood the Factor's home and Hudson's Bay Co. stores. At the west of the row of houses was a Mission Church and rectory, belonging to the Anglicans: and, across a little bay, was a Roman Catholic Mission and various buildings surrounding it. The Chippewyan Indians were dark and unattractive both in complexion and disposition.

On the morning of June 21 the party left the Post and paddled East. It consisted of eight men: J. B. Tyrrell, the leader, his brother James, three Iroquois Indians from Caughnawaga, Pierre, Michel and Louis French, experienced canoemen who had worked on the Lachine Rapids, a half-breed as Eskimo interpreter, John Flett, who hailed from Prince Albert, and two other men who had come from Ile a la Crosse to Fort McMurray. The party travelled in three canoes, Joe and his brother taking a paddle and also a hand in the heavy portaging, when not engaged in their own work.

From Fort Chippewyan to Black Lake it was all clear travelling. A survey with solar compass and boat-log was made of the north shore of

Lake Athabasca. Then the difficulty was to find the portages north from Black Lake into the interior, about which he had been informed the year before. Therefore, it was with much delight that he secured the services of a Chipewyan Indian named Moberly, through the kindness of the Hudson's Bay Clerk at Ile a la Crosse. This old fellow said he knew the portages from Black Lake into the river that led to the Barren Lands: so he was immediately engaged. Finally, after much bad weather and many delays, they arrived at Fond du Lac on June 29. This was an old abandoned Hudson Bay post.

Here the old Indian, Moberly, was to leave his family and some friends who were camped on the south shore. But he immediately began to object about going further up the river to Black Lake, and it was only after much talk and when Joe had agreed to hire, at extravagant wages, a friend of his, a half breed named Beauvois, that he consented to go with the exploring party. He refused to do any more work that day, saying he was tired: so the whole party, Indians and friend and all, went two miles further and camped for the night. That day Moberly and his friend followed slowly in their canoe to the east end of the lake, pitched tent that night, and again, next day, the whole party paddled to the extreme eastern shore, where Moberly and

Beauvois went ashore, lay down, and refused to go further, unless Joe made a feast for all the tribe, divided up his supplies equally amongst the different families, and sent some back to Moberly's squaw.

At this Joe remembered an old adage he had learned from the mathematical master of Upper Canada College, who, when the boys became more unruly than usual, used to say that there was always a point where "forbearance ceased to be a virtue" and then proceeded to punish every one in the class, the righteous and the unrighteous.

After some attempts at reasoning with Moberly and Beauvois he finally became indignant and then angry: and, although naturally of a most peaceful and forgiving disposition, told the two strikers to go to the devil, although he does not record that in his field notes: then he and his own party paddled off hurriedly, having lost two or three valuable days with the miserable old man. It was July 7th before they reached Black Lake and July 8th before they found the portage leading north. They had only travelled two hundred and fifty miles from Fort Chippewyan along a well known route, and it had taken them over two weeks, not twenty miles a day. After finding the portage they struck across the trail that led to the canoe route, about two miles in length, full of thickets and swamps,

over rocky hills, consuming the greater portion of a long day. Finally at ten o'clock at night they reached a camping place in a marsh and had a short rest in their blankets with a few hours of sleep. Next day it was nothing but portages through a chain of six small lakes: and at noon on the eleventh they reached Wolverine Lake, about which Joe had heard. It was a beautiful little lake, but filled with so many long deep bays and with such an extensive shore line that they wasted a whole day and a half in finding the outlet which, as luck would have it, turned out to be close to the point where they had entered. The mouth of the stream was much obscured by islands, and owing to deep water had an almost imperceptible current. After paddling up this stream for half a day they were obliged to camp in pouring rain on a piece of marshy ground, where they spent many miserable hours. Two more days were spent in climbing up the river, over portages and through high, bald hills, until on July 14 they reached a beautiful lake, christened by Joe, Selwyn Lake, which apparently was on the south side of the height of land. Here they pitched camp on a lonely little island, not far from the grave of some Christian Indian, which was marked by a plain wooden cross.

At this stage it was realized that progress was very slow: they had only made eighty miles in a

week: so Joe began to devise all sorts of schemes for facilitating travel: rising earlier, travelling till dark, and putting aside all useless baggage, consuming the tinned goods which weighed like lead, trusting to their guns to supply the greater part of their future food. July 16, Sunday, they had a good rest, three good meals, a long sleep, did their mending and repairing, and, on Monday 17, they rose before daybreak and began to explore Selwyn Lake for the portage which they knew must lead across the height of land to the great river that flowed to the North, the discovery of which was one of the main objects of their trip.

JULY 18

“Selwyn Lake is fifty miles long, but narrow. Lies N 40°E, at an elevation of 1360 feet above sea level. Temperature of water 58°F. It has extensive bays, deep and wide, requiring much time for exploration. In some places the shores are low and rocky, in others flanked by hills of gneiss 200 or 300 ft. high. The country is wooded with small black spruce and occasionally with orchard-like groves of birch. The north end of our last portage opened on its shore. Latitude 60° 10’.”

While on this lake examining the shore line for the portage across the height of land, some Indians were seen camped on the north end of

the lake at the foot of a hill, beside a grove of white birch trees. These fellows did all in their power to dissuade Joe and his men from going further, telling them weird stories about the terrible country through which they would have to travel, and of the Eskimos who lived there, cannibals and enemies of all white men. However, on the following day they agreed, after much talk and bargaining, to conduct Joe to the portage, which led about a mile and a quarter to another lake, Daly Lake. This was the first real progress they had made in their trip to Hudson Bay. It was at the north end of this portage that Joe had a talk with Jim John, an old blind Chippewyan from Reindeer Lake, and obtained much valuable information from him concerning the rivers which flow into the west of Hudson Bay, south of Chesterfield Inlet. The old blind man evidently had been through the country and gave an accurate description of the three river system, all north of Fort Churchill, which flow east and empty into the Bay.

“Daly Lake is just north of the Height of Land, which separates the waters flowing to Lake Athabasca from those into Hudson Bay. It has an elevation of 1,290 feet above sea level, being thus 50 feet lower than Selwyn Lake. Temperature of water on July 21, 58°F. It is made of two portions, one 23, the other 39 miles, in length, joined by a transverse portion six miles long.

High hills of gneiss rise to the south. Some small dwarfed aspens were seen here, evidently their northern limit. Around the shore and extending to the northern limit of the wooded country were mossy areas, which resembled green meadows, a wonderfully beautiful sight, reminding one of pasture land. But, on closer inspection, these areas were found to be covered with green papery lichens, cranberries, trailing raspberry and Indian tea. Beneath this growth, were eight or ten feet of frozen moss, dead and solid. This peculiar formation evidently thaws out enough in summer to produce growth above, which then decays, forming more frozen matter: and thus the process goes on eternally. Trees of course cannot grow on such a soil''.

The party was delayed at Daly Lake by a fierce gale which caused water spouts on the surface of the water and churned it into a mass of foam and surf. During the morning of the 22nd of July, however, after a great deal of searching in deep bays and many disappointments, the outlet was discovered by chance about noon, and the party pushed their canoes into the stream which discharged the lake, a great broad river, with rapid current, broken up at first into many channels, but soon becoming one steady even stream. This was the Doobaunt^s River, full of rapids, which however were deep and easily run by the Iroquois Indians.

Soon they were beyond the limit of trees, which for some time had been growing smaller and in less profusion, being only from 5 to 15 feet high, and very much stunted and twisted by wind. Finally the trees disappeared altogether at Boyd Lake, in latitude $61^{\circ} 30'$. Two miles from this lake Joe pitched camp on July 28: right on the Barren Lands, treeless, leafless, except for an occasional clump of twisted black spruce, two or three feet in height: and, that evening, his cook had difficulty in finding enough wood to make a fire to boil water. This, for the rest of their journey, was their chief hardship: to travel all day, sometimes in cold, wet, snowy weather, and then not be able to get enough fuel at the end of the day to boil water for tea, the great restorer of the internal mechanism of the human frame. At times some driftwood was found on the streams and supplied them with a glorious fire and hot food.

From his field notes it appears that Joe, on July 29 and 30, fell in with the first herd of cariboo, or reindeer, which roam across the Barren Lands in summer, not in hundreds or thousands, but in countless herds: gradually moving south as winter comes and food becomes scarce. The point where he first saw them in any quantity was when on a little lake, called Carey Lake, in honour of Rev. Dr. Carey of St. John's, N.B., afterwards his father-in-law. This was in

latitude $60^{\circ} 15'$. The party was paddling up the lake when Joe saw, on the east shore, a great mass of moving objects, extending for many miles: and, on going across the lake, he saw that they were cariboo, feeding on the wet grassy land near the water.

On getting nearer Joe saw that there was not one herd, but many herds, covering many square miles in extent, so thick that his photographs, taken from every possible view point, some of them right in amongst the herds, show their antlers in the distance just like a forest of bare and twisted spruce trees. The trials and tribulations of the whole party were well rewarded by the wonderful sight of these countless herds which roam across the Barren Lands.

For the last two weeks their provisions had been running low. Eight men can eat a great deal of food when working in the open air. Progress had been slow on account of bad weather and worse luck: and now the question of food began to loom up. To work hard and do with little sleep men must eat much and often: and, up to this date nothing had been seen which had much food value. Fish is well enough for a change, and birds are sufficiently strong food to keep starvation away; but for hard work, meat, bread or fat are necessary. One can do without fire if one has food. Both are better. So, Joe began to think deeply about the question of dietetics

and finally came to the conclusion as so many other northern dietitians have, that only two things are really essential for life, heat and food: or if not those, then raw or cooked meat and a fur bag. Raw meat is better: but they had not yet arrived at that stage of economics: at least as far as he himself was concerned. He had been considering for some days past the necessity of conducting a hunt for bear or some other life-sustaining animal: and here now, the whole question was solved. Cariboo. They could eat all they wished, cooked or uncooked, and take enough along to last them a week or two. Dried cariboo meat is good for a week or ten days and after that will, if properly chewed, sustain life, being a little like wet sole leather.

It was decided to sacrifice a day to a cariboo hunt and another day to the drying of enough meat to last perhaps several weeks. This was fortunately possible because not far from where the cariboo were feeding was a little grove of stunted black spruce a few feet in height, which would provide the necessary fire for drying the meat. Some of the skins could also be saved to keep them warm when winter set in, signs of which were beginning to appear.

Nearly three days were spent in hunting and skinning the cariboo and drying the meat: and the party had some rare feasts on the edge of Carey Lake.

August was now at hand: and they started on their journey again, everyone full of food and the spirit of adventure, optimistic, and certain that they would soon find themselves on Hudson Bay: so great is the power of meat and the blood of the cariboo. The country through which they were now travelling was a treeless, rocky wilderness. They searched and found the outlet from Carey Lake into the Doobaunt River again; but lost a day in the search. Down the river they ran many rapids and soon entered Markham Lake, so called in honour of the great Arctic explorer. Here they felt, for the first time, a sudden change of temperature and of climate. It was not a gradual change, but came on like the tropical night with a decided fall in temperature. Snowbanks were first seen on the hillsides, while, at the north end of the lake, great piles of ice were floating about, unaffected by the August sun. On the shore of this lake the men found the remains of an Indian camp, very ancient and mossgrown, but with sufficient birchbark and fragments of poles to make a real fire and cook their evening meal, which gave them much comfort and cheer.

On the 5th of August they found a small growth of what could hardly be called trees, a group of spruce, a few feet in height, which furnished them with enough fuel for another

hot meal. That was on Saturday. Next day, Sunday, they stayed at that place, cooked provisions and dried their clothing, the rarest of luxuries on the Barren Lands. The nets which had been set in the river the night before yielded some whitefish and trout, one trout weighing twenty-five pounds, a whitefish ten pounds, which they cooked and ate along with cariboo meat. You can imagine the feast they had that Sunday night. During the afternoon Joe and his brother tramped into the interior, and, ascending a high hill, had a fine view of the cheerless country that looked as if it had been left unfinished by the hand of its Creator.

Away to the East, as far as the eye could reach, there appeared a great area, apparently covered with snow, and shrouded in misty clouds which curled upwards and twisted about in huge spirals, dissipating gradually into the upper air. It was evidently a great lake covered with snow and ice which still resisted the heating influence of a midsummer sun. Leading to this great white ghostly plain was a winding strip of silver which ran like a narrow ribbon for several miles from their camp, and then disappeared in fog. Returning to camp they noticed again the remarkable change of temperature, which was dropping lower each hour, owing probably to the proximity of a great area of snow or ice. They were

evidently about to encounter a much lower temperature on the great lake ahead: and the question arose in Joe's mind whether or not he would be able to penetrate with his canoes its icy water. It was no doubt the lake known as Doobaunt or Tobaunt, a portion of which was seen by Samuel Hearne one hundred and twenty-three years before on his journey to the Coppermine River.

Undismayed by the increasing cold and gloomy weather Joe rallied his party and started on the seventh of August to paddle into the great frozen lake, everyone comforted by good warm food and with eyes and brain cleared by sound sleep and rest, determined to get through the lake if it were at all possible. It was not an encouraging outlook for they were leaving the last vestige of timber behind them. They had little but tea, sugar and cariboo meat on which to live: and little or no prospect of making a fire. They descended several small rapids and then, retarded by a heavy wind, were forced to rest on a small islet at the broad mouth of the river, near the entrance to Doobaunt Lake. In the afternoon, the weather moderated and they paddled along an arm of what appeared to be the lake, but, strangely enough, saw no snow or ice. However, on rounding a long point, they came suddenly to the

main body of the lake, which was covered with icefields, very heavy near the shore, a little more broken further out, but too heavy to admit of canoe travel. The whole party went ashore and climbing some hills, got a better view of the condition of the ice. Just at this juncture a fine deer was sighted and Joe made a bull's eye at five hundred yards: and the deer was soon converted into fresh meat.

From the shore a passage was observed which seemed to wind in and out through the centre of the lake: so, returning to the canoes, they started out again, but were forced back on shore by a terrific storm of wind and rain. They pitched their tents to get shelter, but this availed little. It seemed as if a second deluge was at hand, and, to add to their discomfort, not a particle of wood or dried moss was to be found: they were forced to eat raw meat or do without, although they made some tea with the aid of a small spirit lamp and some methyated spirit which Joe had brought along in case of such an emergency. This storm was prolonged and violent, lasting four days, the rain turning to sleet, then to snow, the temperature dropping to freezing point, while Joe and his men lay in misery during the enforced holiday, brooding over their troubles, occasionally taking a look from their tent doors at the huge icefields which blocked their way across the lake.

On the tenth of August they started at four o'clock in the morning and endeavoured to push their way through the ice until eight, and were forced to go ashore. Here, a herd of deer was seen and three were shot and quickly turned into fresh meat. This gave them much courage and hope for the future. Joe, at this juncture, again proceeded to the top of a high hill, and, with his field glasses, got another view of the situation, which was anything but pleasant. The ground around him had suddenly become frozen, and all the little pools and ponds were covered with new ice. It was already August 10th and he had still a thousand miles to go. The prospect was certainly not good for advance. He began to wonder if it was Spring or Autumn.

However, while these thoughts were running through his brain, he was buoyed up by his Irish optimism, and set to work to devise some means of proceeding rapidly across the lake. Just then he spied open water far to the north, or at least what looked like open water, away beyond the icefields. He quickly decided to portage across the ice, close to shore. This was immediately done: and, after long delays and much strenuous work, they were again in open water, but blocked once more by ice after paddling several miles. They were again forced on shore and had to camp in a deep bay, rather disheartened by

their bad luck. No wood or dry moss was available for a fire. Everyone and everything was soaked through. The temperature fell lower and the ice seemed to grow thicker. Joe made up his mind, however, that, as long as game was in sight and they could get meat, he would push on down the great water system that must lead to the salt water at some point north or east.

AUGUST 11, 1893

“The morning broke cold and dreary. Ice everywhere covered the ponds, but all were glad to see that the icefields had moved off shore and open water was seen for some miles. The canoes were quickly launched and we went again on our way. Several white wolves were seen along the shore, too far away to shoot. They are evidently following cariboo.”

That night after a long day's work they landed in darkness and found themselves in the company of a pack of gray or timber wolves; but Joe shot their leader, a huge brute that must have weighed a hundred pounds, and the others quickly disappeared, although they made sleep impossible by howling all night from a nearby hill. This pack of wolves was doubtless one family, including a number of very young ones, only a few months old.

They were now close to the northern end of the lake and they started out to search for the outlet. Doobaunt Lake is a large body of water, although when seen on an ordinary map of the north it is a mere spot. It is of unknown extent. Joe surveyed its northern shore for one hundred and seventeen miles and computed the area he saw to be about twenty-five hundred square miles. From the summits of high hills on the west the east shore could not be seen on a clear day. It is about five hundred feet above sea level. From Eskimo reports it appears to have two affluents. The latitude of the mouth of the Doobaunt River where it enters the lake is $62^{\circ} 55'$. The body of the lake was covered with ice when the party entered it and was overhung with mist. After eleven days on the lake they finally, after much searching, discovered the outlet at the north end and amidst a succession of furious storms which detained them for two days on the icebound shores, during most of which time all the party could do was to huddle together in tents and drink hot chocolate made on the spirit lamp.

On the morning of the 18th they started down the lower river which was a fine stream, two hundred yards wide, with a current of about four miles an hour. Several miles below the outlet were heavy rapids which they had difficulty in

running. In this vicinity were observed the first signs of Eskimos. Rings of camp stones, bows and arrows, the handle of a whip and some willow ribs of a "kyack" were seen.

On the morning of the 19th the party started across a lake, christened Grant Lake, in honour of Sir James Grant of Ottawa. Its latitude was found to be $63^{\circ} 44' 30''$. Here additional signs of Eskimos were seen and all were much delighted also to find on its sandy shore driftwood of willow with which they loaded their canoes for future use. Passing through Grant Lake, which was about seven miles in length, they arrived on the evening of the same day at the river flowing north from it in a broad swift stream. Here they sighted an Eskimo lodge and a man standing at the entrance. Joe soon made friends with him and his family of two wives and six children by presenting them with a few needles and some tobacco and tea, and got some information about his future route which he was told led into a bay, probably Chesterfield Inlet.

The lodge of these Eskimos was clean and well kept, made of stout spruce poles brought from some distance, and covered with deerskin. They had a large kettle, two guns, and many small articles of civilization. From these Eskimos Joe bought mitts of reindeer skin for use of his

men, and in return gave them some powder, bullets, and gun caps. The man, who was a fine handsome fellow, had taken the venturesome trip up the river from the Bay in order to hunt musk-ox, the robes of which are very valuable.

Bidding this family good-bye Joe hurried on down the river, anxious to make progress while the travelling was favourable. Another lake was crossed next day, about twenty miles in length, where a number of reindeer were seen and shot for food at ranges from four to five hundred yards. It was now August 22nd, and the skins of these animals were in prime condition: so Joe kept them for use later on, to cover them at night. On down stream they went, sometimes wet, at other times hungry, always cold: the luck varying from day to day; but always getting nearer to the waters of the sea.

On the 24th they camped beside a conspicuous peak of trap, where the river was a noble stream, deep, wide, running swiftly between high banks of sand or rock.

On the 25th the stream began to take a westerly course, then a northwesterly: and, accordingly, Joe became alarmed for fear he should be going down into the Arctic Ocean instead of Hudson Bay. He had already passed north of the latitude of Baker Lake which, according to all his information, lay upon his route: and,

therefore, was much pleased when, towards evening of the same day, a marked change took place in the character of the river. The banks grew lower and consisted of sandstone, the water became shallower, and broadened out into numerous little lagoons, filled with islands, and, much to the surprise and pleasure of the party, abundant driftwood appeared, not small, but large trunks of trees, some six or eight inches in diameter, indicating that they were near the confluence with some other stream which brought down driftwood from wooded country in the interior, further west. Many geese were seen at this point on the low grassy spots and islands. On the evening of the 25th they pitched camp on one of these beautiful little islands and made a great blazing fire of driftwood, the first they had had for a long time.

From camp, on the morning of the 26th, for four or five miles they still went north; but in latitude $64^{\circ} 41'$, the river turned east and then southeast, and it was not long before they reached a great lake with sandy shores and a beautiful outlook, which was called Aberdeen Lake, in honour of the Governor General of Canada. There was no doubt they were the first party of white men to view this beautiful expanse of water, which was about fifty miles in length and sixteen in greatest width, with an area of

about three hundred square miles. The temperature of its waters on August 28th was 40° F.

From the summit of a hill the river flowing from Aberdeen Lake was discovered. A whole day had been lost searching for it in the south-eastern bay. They groped their way down stream in a thick fog and made a stop on the north side of an expansion of the river where Joe determined their latitude, and found it to be 64° 43' 27". In a short time they reached another lake, Schultz Lake, named by Tyrrell after Sir John Schultz, Lieutenant Governor of Manitoba, about twenty-four miles in length and about six miles wide, and were making good progress, when a terrific rain storm set in and lasted three days, preventing all progress and driving the whole party to their tents for shelter. Joe, in spite of wind and rain, examined most of the surrounding country and discovered some titaniferous iron ore in the low hills behind his camp. It may be mentioned here that the whole region extending from Doobaunt Lake to Baker Lake contains Huronian schists and trappean rocks, very similar to the silver, gold, and copper bearing rocks of the north shores of Lake Superior and Lake of the Woods. The time will come when the prospector and the miner, with the aid of radio and the airplane, will find new fields of exploration for mineral wealth on this stretch of the Barren Lands.

It was near this camp that the whole party had at least the satisfaction of knowing that they were on the road to Hudson Bay; for they met a camp of Eskimos who informed them that they were not far from Baker Lake, which is really a western extension of Chesterfield Inlet. In fact the Eskimos offered, for small presents, to accompany them to its shores.

On the evening of September 2nd they reached the mouth of the river which empties into Baker Lake, at its northwest angle, and pitched camp with a deep feeling of satisfaction, although they were, the greater part of the time, cold, wet and hungry.

^sBaker Lake, upon which no white man had set foot since Captains Christopher and Duncan were there a hundred years ago in a search for the northwest passage, lies generally east and west, with a total length of forty-five miles and a width which they were not able to determine, but which seemed to be about twenty miles. Its southern shore was not examined, but its west end appeared to be all sandstone. The north shore was completely surveyed. The temperature of the water in the open lake was 41° F. on September 6th. It is free of islands.

They paddled out into the open lake, being barely able to ride the heavy waves without swamping, and turned eastwards, until they

reached a small stream coming in from the north about three miles from the mouth of the Doo-baunt River. A heavy storm set in as they reached this stream and detained them on the shore for two days. On the morning of September 6th, before they left camp, all the small ponds in the vicinity were frozen over, and the wet sand of the beach was frozen sufficiently hard to permit a man to walk on it readily. Up to that date the whole party had been living on cariboo meat, but at this camp they left the reindeer behind: and from there to Fort Churchill none were shot. On the evening of the same day they passed Bowell Island, named for Sir Mackenzie Bowell, afterwards Premier of Canada, at the entrance end of the lake around which two outlets flow down into the Inlet beyond. They took the northern outlet and were much surprised to find the water flowing up against them, but soon discovered that the tide was coming in from the Bay and overcoming the current of the stream.

Soon they reached Chesterfield Inlet proper and were on their way at last to the sea, with nothing to stop them but winter and lack of food. This Inlet is one hundred and twenty-five miles long and runs nearly east and west in latitude $63^{\circ} 58'$: with Baker Lake and other expansions it is two hundred and ten miles. The sides are

rocky slopes from one hundred to two hundred feet high. The depth of the water varies up to forty fathoms. A tide of six feet was seen at *Bowell Island*: at the mouth of the Inlet it amounted to eighteen feet.

Joe reached the mouth of *Chesterfield Inlet* on September 12th, and next morning started to paddle south on *Hudson Bay*, which he speaks of in his field notes as a vast body of water, the most inhospitable and dreary that he had ever seen. He had still five hundred miles to travel in order to reach *Fort Churchill*, the nearest point of northern civilization, and he realized that it would be a difficult task, owing to the lengthening nights, low temperatures, bad weather and practically no food except what they were able to shoot on the trip.

Fortunately, the 13th was a comparatively warm day: and that night they camped on the shore of *Marble Island*, whose snow-white mounds of white quartzite can be seen for many miles, and constitute one of the landmarks on the barren shore. It was visited by *Commander A. R. Gordon* in 1885-6 when he was appointed by the Dominion Government to investigate the possibility of navigation through the Bay and Strait: and its position had been fully determined. *Jim Tyrrell* was a member of *Gordon's* expedition and had spent a winter on

the Bay, so that he was again on familiar ground: though, instead of walking on the deck of a steamship, he was now sitting in a little cedar canoe.

There were no whalers about and no Eskimos; but, as the weather continued fine, they were in great spirits and kept on down the coast in a southwesterly direction, crossing the mouths of many deep bays from headland to headland, instead of hugging the shore, and thus saving much valuable time. One deep inlet, Rankin Inlet, many miles in extent, was crossed in half a day, whereas, if they had been forced to paddle around the shore, it would have taken them at least three days. Little game was seen; but they still had cariboo meat, which was, however, rapidly becoming so dry that it resembled the sole of a moccasin. Joe figured out that they ought to reach Churchill in two weeks, and rationed out the provisions accordingly, so that they would last five days: during the remainder of the time the question of food would have to take care of itself.

On the evening of the 15th his hopes were blighted by a gale of wind: and all the following day, they lay on a sandbar above high tide in a little inlet with no fresh water to drink, no fire, very little food. Rain set in and continued for forty-eight hours: then a lull came, and, although

the roll of the sea was high, Joe decided not to lose a minute, and the party set off across Corbett Inlet, from north to south, about eight miles. Everything was going fine and the white caps had all gone: the under swell was great but with no combing crests to swamp them, and they were in hopes of reaching the southerly point, when, suddenly, the wind changed, sprang up from the direction of the shore, and lashed the waters into foam. It was all the party could do to keep afloat and the situation was beginning to look serious, when they managed to get near a rocky portion of the shore, and obtained shelter behind some broken reefs. They all had to jump out into five or six feet of water, amidst surf and spray, and pilot the canoes ashore through boulders and broken stone, until they reached a point of safety, above high tide, surrounded by the most dreary looking country they had yet seen, with not a vestige of living things. Here they continued two whole days until the gale blew itself out, subsisting on two gulls and a small duck which Joe was fortunate enough to shoot. A few broken ribs of an Eskimo "Kyack" were found on the shore and these supplied them with a little fire to melt snow and boil enough water for tea.

On the 20th, camp was called at 4 a.m., as the wind had fallen, and the journey was resumed without breakfast. Later that day each man got

a small piece of dried cariboo to chew, which was all the food that they had that day. For two days they travelled in this manner, stopping for nothing, but chewing, occasionally, a little cariboo meat and drinking tea made with cold water. This soon began to tell on their strength, so that when another gale came, and lasted until the morning of the 25th, Joe ordered a hunt to be conducted on shore in order to get food to give his party some strength to continue at their paddles. Joe and his brother James walked into the interior and discovered a large stream flowing into the bay near their camp known as Neville Bay. While exploring the shores of this bay Joe shot a ptarmigan which he and his brother roasted on a little fire made of some dried moss, and ate, thus giving them some strength to go further.

Deep snow lay on the ground in most places and walking became difficult; but they kept on until they finally saw some deer tracks, the first they had seen since leaving the interior: and, although it was beginning to grow dark, they decided to follow them, so great was the power of hunger. The tracks were not fresh, perhaps a day or two old, as they were frozen around the edges. Fortunately they led in the direction of their camp, so they followed them all the more keenly. Soon it became dark and after a long

tramp they were obliged to sit down and rest before going further. They saw no deer in the end, but soon recovered their spirits when they reached camp and found that the men had succeeded in shooting three ptarmigan and several rabbits close to camp. From these a soup was made and their strength restored for a few hours.

Next day they shot some sea ducks, and made fair progress, as the wind dropped, and there was little sea. The day after, being again storm-bound, another hunt was made for food; but all they got was five marmots, little animals about the size of squirrels. The morning after, although it was blowing a gale, Joe determined to make a start, as delay meant death either by starvation or cold. There was apparently no large game in that vicinity, and he realized that he and his party were gradually being weakened by want of food and the rapidly lowering temperatures: and that they must soon reach Fort Churchill or perish, as so many others had perished on that bleak and desolate shore. He himself was also under great mental strain on account of his responsibility to his men, which seemed to take away his appetite for food and thus diminish his physical strength. He had, as nearly as he could calculate, three hundred miles yet to go to reach safety and at ten miles a day

this meant another month, by which time winter would be upon them with all its arctic severity and stormy weather. Snow, ice, frost stared him in the face. He had now not a bit of food. No fuel was to be had, the country was covered with a deep white snowy mantle, and the air was piercingly cold. It was difficult to appear cheerful under such conditions, but he at least had to appear so and to talk of the future as if it were full of hope; although he knew quite well that unless they could shoot a deer or bear, or enough rabbits to keep their strength up to standard, there was little chance of them escaping with their lives.

On September 28th after launching their canoes, they saw a band of deer on shore, and immediately all their thoughts were concentrated on food. They proceeded carefully ashore, though with some difficulty, as the tide was going out, and the water rapidly receding on the shallow beach. Joe and his brother started after them, but found them difficult of approach. When they travel in small bands they are much more alert than when grazing upon the Barren Lands. The country roundabout was also a wide vast plain, affording no cover for a hunter, except a few small boulders here and there. Concealed by these they crept up on the band until they were within five hundred yards, when

they both opened fire; but the deer trotted off at a good pace, leaving them disconsolate and almost too tired to get back to the shore, where they found the tide out, the canoes high and dry out of sight of water, so low and flat was the shore in that vicinity. That night, however, one of the Iroquois Indians, Louis, tracked a polar bear and killed it after a thrilling battle on the snow and ice. When the news was announced by Louis, who came into camp with a claw of the bear as evidence, the whole party set out for the carcass which lay five miles away: and, building a fire of moss right on the spot, they cut steaks from the bear, roasted and ate them, even before the beast was skinned. They were in fact desperate with hunger, and ready to eat anything which contained blood.

The flesh of the polar bear is famous for its rankness, tasting, as Joe once remarked, like beefstake fried in cod liver oil; but, on this occasion he would not have given the carcass for its weight in gold. From his field notes the following measurements are taken:

Length from tip to tip	6 feet 5½ inches.
Around chest	51 inches.
Height, from toes to top of back....	38 inches.

It was fat and full of grease, yielding about 300 lbs. of beef and fat. They had now plenty of

food and gathered enough moss the following morning to boil some of the carcass, which was calculated to take them to Churchill.

In the afternoon of that day a most terrific easterly wind arose and lashed the waters into surf which was mountains high, rolling in on the beach in such volume that any attempt at launching a canoe would have been disastrous. The storm lasted five days and ended in a violent snowstorm which covered everything many feet deep. Their tents were blown down and torn and had to be repaired in blinding snow. To add to Joe's mental distress the liver of the bear had been fried and his brother Jim had partaken freely of it, becoming terribly ill thereafter. All arctic explorers speak of the danger of eating the liver of the polar bear, which does not seem to possess the wonderful qualities which are supposed to be inherent in the liver of the calf. Jim nearly died that night and has probably never eaten liver again.

On October 4th the party crept out from their tents to find everything painted white: the whole country being buried in snow, making it impossible to get any more moss for fuel. Winter had come with its icy breath, and the water along the shore was beginning to freeze. It was evident that canoe travel was nearing the end. They were still 270 miles from Churchill and

had already been three weeks in travelling the same distance from Chesterfield Inlet. The prospect of reaching Fort Churchill by canoe began to look dismal in the extreme. However, that day the canoes were again launched by carrying them out half a mile over the ice-covered flat shore to meet the incoming tide. During that day they had good luck and paddled, as nearly as could be estimated, ten miles in the open sea, against a southwest wind, which continually drove a light snow in their faces and covered them with a frosting that resembled the icing of a Christmas cake. They camped that night on a low shore, being obliged to carry their canoes half a mile to the land above high water mark. They spent the first of many nights, each one more uncomfortable than the preceding, suffering all the horrors of arctic travel, with the added discomfort of sitting during the day with their feet in icy water, which lay in the bottom of the leaky canoes to the depth of three or four inches. The following are copies verbatim from Joe's field notes:

THURSDAY, OCTOBER 5

"Last night was very cold, but this morning is beautifully bright and clear with a stiff southwest wind still blowing straight up our course. At six o'clock I sent all the men to look for something to burn and it was 9.30 before they returned with a small quantity of juniper and

dwarf birch. We were obliged to wait until afternoon for the tide. The sun was very bright and clear, so I took our latitude and found it to be $61^{\circ} 31' 10''$, a few seconds nearer home. Just after noon we launched our canoes and struggled against a heavy wind which forced us ashore at high tide in the bottom of a bay, having gone only two miles. We had to go inland half a mile before finding a place to camp and even then had to clear away a foot or two of snow to allow us to pitch tent. It is clearly hopeless for us to try to reach Churchill with all the canoes and our present load."

FRIDAY, OCTOBER 6

"The morning was beautifully clear but very cold. We got up at 3 a.m. when the tide was up, in order to get away if possible, but a south wind, with the darkness and a light driving shower, made it quite impossible. It now became very necessary to make other arrangements to get south to Churchill. The men thought we all could go in one canoe. Accordingly James and I sorted out all the stuff . . . , took our note books, exposed photographs, and the collection of plants, put our blankets in our bag, the field glasses on our backs and took also our guns and ammunition. All the rest of the stuff we cached, covering it carefully with the two canoes on a gravelly knoll a third of a mile back from high water mark. The location of the Cache is $61^{\circ} 30'$ with bearing 150° , magnetic to a rather high island and 350° to a most prominent bluff back up the shore. We took two tents, broke up the grub box, made a fire and a hot cup of tea, the first we have had for two days. By this time the tide began to come in and we loaded the canoe and got in and waited until the water raised us off the ground. We worked our way with great difficulty through a mile of ice; but, as soon as we reached open water, we found that the canoe was entirely too heavily

loaded, the water washing in on both sides, besides which we were so huddled together that we could not paddle. So we pushed back to the shore, ran up and emptied one of the other canoes . . . and got the canoe back in the water just as the tide began to fall. We then paddled out, four in each canoe, and travelled until 7.30 p.m., long after dark, a head wind blowing, the spray freezing on our beards, while our paddles were covered with ice. Went to bed without food or water."

SATURDAY, OCTOBER 7, 1893

"Last night was extremely cold, so that we were obliged to eat something this morning; some pieces of duck I had shot fried in bear's grease, an excellent dish. We had also a cup of tea though it was hard work getting enough water, having to melt snow. Passed Cape Eskimo and crossed a deep bay and camped on a flat, where we found some wood left by Eskimos and had a good fire and hot supper. The boulders here are chiefly red and grey gneiss."

Next day they made good progress, but passed long cakes of ice, some of them carrying large imbedded boulders. The ice was beginning to thicken along the shore and at night they were obliged to portage long distances inland over broken rock and ice, in order to reach a suitable camping site. The snow was deep everywhere, but having shot some sea ducks and found some driftwood, they had another fire and hot soup. The canoes were at this time all covered with ice and the spray was constantly freezing on their

paddles: whiskers a mass of ice. Temperature 23°F. The week passed with varying luck. One day they ran with a fair wind for perhaps 20 or 30 miles. Sometimes they found a little wood left by Eskimos on the beach and had a good fire and supper, at other times going to their tents both cold and hungry. Once they passed a deep bay and saw many trunks of trees about, indicating that there was some river flowing into the Bay from the West, down which white spruce trees had been carried. Sometimes they shot ducks, at other times a few ground squirrels. Twice they paddled in bright sunshine and made wonderful progress, finding dry wood on the shore at night, piled by the Eskimos well above high tide.

Towards the end of the week they passed some growing timber in the distance, and hailed this with great delight, as giving promise of fire and meat; but a storm set in and delayed them for a whole day: so Joe, in order to save the party, tried the experiment of sending a man ahead on foot to Churchill, which he calculated could not be more than two days journey.

FRIDAY, OCTOBER 13

"Wind from southeast all day. Unable to launch the canoes. James and I not able to walk and Louis reduced by dysentery. However, we shot a hare which we had for

breakfast: and I got six ptarmigan later on in the woods. Day fine and bright."

SATURDAY, OCTOBER 14

"This morning John returned, being unable to cross the Seal River on the way to Churchill and not having had anything to eat since he left us. We had breakfast of seven ptarmigan. Started out again in the canoes as the weather seemed favourable. Paddled all day, hugging the shore; but the tide took us out gradually in the Bay until we were five miles from shore. We met huge blocks of ice off the mouth of Seal River but managed to get through. We kept on till dark. I shot sixteen ducks to-day; but we were forced to stay out in the canoes all night as it was impossible to get ashore."

SUNDAY, OCTOBER 15

"The morning dull and gloomy and everyone was stiff with cold. Michel had his feet frozen last night. It was noon before we got ashore, pitched tent and cooked some ducks, which, with the heat of the fire, revived us a great deal. The Bay seems full of ice. It will be impossible to put our canoes again in the water. Most of us are in bad shape. So I have decided to send John and Jim, the two western men, who are in fairly good shape, to Churchill on foot to get assistance."

In fact everything was frozen up tight along shore, and in order to get the canoes out to open water it would have been necessary to carry and push them through fields of ice a distance of nearly a mile, only to find that the ice floes were being rapidly cemented together. They were all in very bad shape. Joe could hardly walk and,

in addition, was under great mental strain which had reduced him to a mere shadow of his former self. His brother James was not much better. Michel, one of the Iroquois Indians from Caughnawaga had his feet frozen. The other men, with the exception of the two western ones, were hardly able to crawl in and out of a canoe. It was time for action.

MONDAY, OCTOBER 16

"The morning broke with a cold northwest wind, and, after breakfast of ducks and some rations from a seal which I shot, I sent Jim and John off to Churchill for assistance. After they had gone we moved into some woods inland amidst a group of spruce and tamarac, some of the spruce being a foot in diameter and thirty or forty feet in height. We cleaned off the snow which was a foot deep, with our paddles and pitched our camp on a level swampy spot and near a small creek with overhanging willows. We now have water, fire and food. We built a large fire and, as ptarmigan were abundant, were fairly comfortable: at least as long as our ammunition lasts."

TUESDAY, OCTOBER 17

"We shot 28 ptarmigan. I endeavoured to write but my hands and fingers were so stiff that I was unable to form letters, except with great difficulty. Dried our blankets and clothes and slept warm. Michel complains of his frozen feet."

WEDNESDAY, OCTOBER 18

"Morning clear and bright, southwest wind. Shortly after noon Jim came running to our tent with a dog team

and provisions, saying that two more sleds and a cariole were coming with 22 dogs. He also brought some bread from Churchill, which was immediately set on by us and speedily demolished."

Next day they all started for Churchill which was not more than forty miles away: which they reached at night, and were soon in the midst of civilization at the Hudson's Bay Post, where they remained until the ice took on the rivers, November 5th. Their stay at the Post was not as pleasant as expected owing to the peculiar attitude of the Clerk in charge, who, although kind enough in his own way, evidently followed the instructions of his superiors as far as aloofness was concerned. Let Joe's field note speak for himself:

"We were met on the platform by Mr. Matheson, a young man about 24 years of age, who is at present in charge of the Post, although he is soon to be relieved by Captain Hawes who is at present on the ground. After washing we asked for a new clean set of underclothes but were told that there were none for sale in the store. We immediately set to work to attend to Michel's feet and soon had him washed and doctored with burnt alum, sulphate of zinc and sweet oil. It will be a long time before he is able to walk. We are all in rags and I tried to get a few clothes from the store, but even what was necessary to keep us warm was furnished with the utmost reluctance. I was unable to get food for the men, only a few rations of canned beef, pork four years old, flour and a little tea. After a dinner of boiled ptarmigan and water, called on Mr. Loft-

house, the Anglican missionary, and was received with great kindness and treated to a good meal. We are of course very hungry and begin to suffer from inflammation of the stomach and bowels, owing to our rations of ptarmigan and water. Mr. Matheson is very anxious to get us away, but the river is not yet frozen over. I went to see the men and told them to get out and shoot what ptarmigan they could, to help us on our way home. I asked Mr. Matheson to sell us some of his traps, but was refused them, unless the men would sell him any furs that they might catch at his price. I was told that everything we ate would be charged to our bill. At the mission Mr. Lofthouse had been able to grow turnips, lettuce, radishes, onions, carrots, cress, rhubarb, thyme, sage, parsley and brussels sprouts."

OCTOBER 27

"The men returned to-day with 115 ptarmigan, 25 of which I sent to the mission. Went over to-day and obtained from Mr. Lofthouse the history of its formation."

On November 6th, the river having frozen over, Joe and his party started on snowshoes to Winnipeg, a distance of nine hundred miles.

MONDAY, NOVEMBER 6, 1893

"We left Fort Churchill this morning at 8 a.m., our train being composed of Mr. Matheson with four teams of dogs going to Stony River for supplies left in the boat by Capt. Hawes and Mr. Lofthouse, and myself with one team. In all 15 men, 5 teams. We crossed the river, much of the ice being rough, and entered upon level country that would be wet and mossy in summer time, but in winter provides a fine road, generally open, with an occasional oasis of small

spruce. In one of these spots we have camped. 21 miles from Churchill."

The days following were passed in much the same manner as the first, with an occasional stop for hunting deer, or in very stormy weather. On November 11th they bade goodbye to Mr. Matheson and on November 14th they reached the Nelson River, where they were detained by a blinding snowstorm and very cold weather, along with huge blocks of floating ice in the river. They were, by this time, running short of food, so started out for a hunt and managed to get five ptarmigan and a rabbit, also a kettle of fish, which had been dried and pounded fine, from a small cache nearby, as well as a large seal carcass for dog meat. Each man got $4\frac{1}{2}$ pounds of dried fish to eat as well as some pieces of ptarmigan. After dark they got a very lean deer, thus supplying them with provisions for a few days longer, at least until they crossed the river. Snow storms followed each other in rapid succession: and sometimes they were unable to see more than a few yards ahead. The thermometer stood most of the time well below zero. Michel's feet kept troubling him and great anxiety was felt on his account by all his companions. They managed to cross the river on November 23rd and started on the 24th in bright moonlight along the shore: then, as the sun arose,

crossed to York Factory, where they arrived before noon. Mr. Mowat, the clerk, was away, but Dr. Milne allowed Joe to purchase some jam out of the store and put it on the table. On November 28th they left York Factory and started along the ice on the Hayes River. They met Mr. Mowat coming from Oxford House with his team, and, after greeting him and passing him, had the advantage of his tracks, making therefore much better time. Soon they saw signs of real civilization in the shape of an ox-trail which had been cut many years before by the Hudson's Bay people, in order to haul goods from Fox River to Oxford House. The country also began to get a more wooded appearance, the shores of all the streams being well covered with black spruce, pine, poplar and birch. They reached Oxford House on December 7th, tired and hungry: but were given a great welcome by Mr. and Mrs. Isbister as well as a good supper.

At this point Joe and his brother James made a map of their route from Churchill to Oxford House to lay before the Minister of the Interior.

They started off again on December 14th, and passed through a more interesting country than the tamarac swamps through which they had come, some of the rolling stretches being well wooded with pine, spruce and poplar, a pleasant sight to look upon after the dreary wastes of the

Barren Lands. On December 17th they ascended the Winnipegosis River and travelled along the northwest shore of the lake of the same name in a snowstorm: reaching Norway House on December 20th. Here they were kindly received by Dr. Strath, who was doctoring the Indians there: and also by Mr. and Mrs. J. K. Macdonald of the Post.

DECEMBER 21

“Have been busy all day preparing for our final run and settling accounts. Have ordered four teams of dogs to convey us to Selkirk. I have also arranged for Jim and John and Francis to go up the Saskatchewan home. I sold them my team of dogs for 25 dollars. Peter and Louis go with me to Winnipeg.”

Ten days later the party drove into the little village of Selkirk about six o'clock at night: and after sending telegrams to Ottawa, went on to Lower Fort Garry and stayed there over night. On January 2nd Joe and his brother James took the train on the west side to Winnipeg and on January 6th started home by steam road, reaching Toronto on January 8th. Joe went to Weston to spend a few days with his father and family: and finally arrived in Ottawa on the morning of January 11th, 1894.

CHAPTER IX

SECOND JOURNEY TO THE BARREN LANDS

ALL during the winter of 1893-4 Joe had been planning another trip to the Barren Lands with the object of investigating the great river which he suspected flowed into Hudson Bay, between Churchill and Chesterfield Inlet: and, having obtained permission from Dr. Selwyn to make the journey, he made all preparations for an early start.

He left Ottawa on May 28, 1894, accompanied by Mr. R. Munro Ferguson, A.D.C. to His Excellency the Governor-General of Canada, who provided his own canoe and men. Mr. Ferguson also supplied the party with several instruments, and, throughout the whole season did everything in his power to advance the interests of the expedition. Its complete success was largely due to his constant and enthusiastic energy and assistance. The party used cedar canoes, and Joe made an arrangement with Mr. Chipman, Commissioner of the Hudson's Bay Company, for obtaining any additional supplies that might be needed from their trading posts, if the articles

were not wanted for the Company's own use. A supply of provisions was also purchased and sent up to Fort Churchill by the Company's steamer *Erik*, which would serve them on their return trip, in case of another delay at Fort Churchill.

The party left Selkirk on June 16th, but it was June 22nd before they reached Grand Rapids at the mouth of the Saskatchewan. Here the canoes were put in the water for the first time, and they started for Cumberland House, which they reached July 2nd, their progress being delayed by rapid currents in the river. July 4th they left Cumberland House and turned north up the Sturgeon River to the Churchill, where they arrived without accident on July 10th. From this point they paddled up the route, well known to Joe from his previous explorations, along the Churchill, up Reindeer River into Reindeer Lake, and along the eastern shore of this lake to the northern end, where the Hudson's Bay Company have the post of Du Brochet, (Pike Portage), the most northerly trading post in that part of the country. Here the Roman Catholic Church have a fine mission: and it is here the Chippewyan Indians from the surrounding district go two or three times a year to barter furs and deer meat for ammunition and clothing. About Christmas a few Eskimos also come

in from the Barren Lands, bringing musk-ox robes and reindeer skins; but throughout the year the fur trader and the missionary are almost alone.

From Frog Portage to Du Brochet is about 250 miles, so that they had already paddled close to 645 miles with 19 portages: up the Saskatchewan to Cumberland House, 215 miles, Cumberland House to Frog Portage, 180 miles, Frog Portage to Du Brochet, 250 miles.

This post of Du Brochet is about 3 miles from the mouth of the Cochrane River which empties into Reindeer Lake at the northeast extremity. The position of the Hudson's Bay store here was found to be in latitude $57^{\circ} 53' 16''$, while Mr. Dowling, two summers before, had placed it in longitude $101^{\circ} 52' 42''$. Variation of the compass in July, 1894, was $20^{\circ} 30'$ east.

From this point they ascended the Cochrane River, a beautiful stream, about 150 yards wide, with a current of two miles an hour: in some places expanding into wider stretches with no current at all, and occasionally narrowing up, with heavy rapids where a canoe had to be tracked with a tow line. The water is clear and cool, the shores and the surrounding country being wooded with black spruce and larch, and clumps of Banksian pine. The canoe route across the height of land leaves the river about one hund-

red miles up, where four long portages were made into a chain of little lakes: afterwards it was nothing but a series of portages from one point to another, until they reached the height of land between the Cochrane and the Thlewiaza River which has an elevation above the sea level of 1,425 feet. Down this stream they went until they reached Thanout (Gravel Ridge) Lake: and, a mile below the north end of this lake, they met Red Head, chief of the Chippewyans who trade at Reindeer Lake, who had a comfortable house where he spent the winter months. From this point they travelled down stream, or rather walked across several portages where the ground was strewn with boulders of all sizes, which made walking very difficult. They reached latitude $59^{\circ} 35' 43''$ at Theitaga Lake, elevation 1,200 feet, where another chief of the Chippewyans, or rather sub-chief, with an unpronounceable name, had also a winter house and home where he enjoyed his Christmas holidays. It was now the 30th of July, and Joe, remembering his former experience, pressed on, rising before dawn and travelling till dark, over a long chain of portages, 25 in number, some short, most of them nearly a mile in length, until he reached Roosevelt Lake near the source of the north branch of Thlewiaza or Little Fish River. There is a hill 200 feet in height, the highest point in the

vicinity, from whose summit an extended view of the region was seen, in the distance beyond, a beautiful sheet of water, shining and bright, in an almost treeless country. A few more portages brought them to this body of water, White Partridge or Kasba Lake, about which Joe had heard so much the year before, as being the headwater of a great river draining into Hudson Bay.

White Partridge Lake, the large reservoir near the source of the Kazan River, is 1,270 feet above sea level. It is about 50 miles in length, average width 10 miles. It is narrow in the middle, with a few stony islands near the shore; but, otherwise, an open sheet of water. Temperature of its water on August 8th was 56°F. The Kazan or Partridge River flows from this lake, with a slight current, over a bed of boulders, and then becomes a quiet stream, then a series of rapids with a fall. Below this fall it flows with a swift current over a shallow channel, whose banks are wooded and are mostly sand or boulders. In a few days they reached Tabane Lake, whose northern outlet was in latitude 60° 38' 07"; showing that their progress was very slow. In another day they reached Ennadai Lake, a long stretch of water, perhaps 50 miles in length, averaging eight miles in width, where their progress was more rapid. Near this lake the forest disappeared. Joe was, once more, on the edge

of the Barren Lands. On down the Kazan River they went for many more days, over portages strewn with boulders, until they reached the land of the Eskimos. Trees and Indians had gone completely, and the little brown-eyed iron men had taken their place.

The first band they met was on a lake in latitude $61^{\circ} 30'$ where several families were camped on a stony beach. These camps, Joe noticed, seemed to be permanent ones, and were situated at spots where the cariboo crossed the river. The animals are speared in great numbers here. Some are eaten at once, while the carcasses of others are piled in heaps, and covered with large stones for winter use.

Further on, they met a little old bald Eskimo, a rare thing amongst such a long-haired race. At this point Joe camped, as he saw a few black spruce, and wished to enjoy a real fire before crossing the Barren Lands.

Next day he was fortunate enough to engage two of these Eskimos, a father and son, to pilot them down stream to Hudson Bay and keep them supplied with cariboo meat, so that he might save time thereby and make greater progress, which was very essential, now that Autumn or Winter was not far away and he did not wish a repetition of the hardships of his previous expedition.

A short distance down stream Joe noticed many caches of cariboo meat, piled up and covered with rocks of all kinds, a bunch of antlers projecting high above each pile, so that, when winter and deep snow came, the caches could easily be recognized from a distance and identified.

The country soon began to get low and wet and became covered with pools of water and reindeer moss; and numerous families of Eskimos were seen camped at various places, evidently hunting cariboo before they went south for the winter. On Angikuni or Big Lake, just north of latitude 62° , they met many Eskimos, Joe counting as many as 23 in one band: and, as the party was delayed here half a day by adverse winds, he took occasion to visit an Eskimo trader, Anuleah, who makes a trip every year to Du Brochet, taking down the furs collected by his neighbours and bringing back tobacco, ammunition and clothing. He was the first commission merchant Joe had met amongst the Eskimos. Anuleah was greatly surprised to find that the members of the party were not traders, and delighted when Joe made him some small presents, not only for himself, but for all his people. He agreed to carry a letter to Du Brochet, and, true to his word, he did so, the letter reaching Ottawa, via Cumberland House and Winnipeg on March 5, 1895, a six months' trip.

As the wind blew a hurricane and lashed the waters of the lake for three days, Joe camped on a large island nearby and put in the time geologizing, and taking their latitude, which proved to be $62^{\circ} 14' 9''$, compass variation $24^{\circ} 30'$ east. The time was also passed profitably in obtaining a vocabulary of the language of these inland Eskimos from their two guides, who were both men of high intelligence.

Big Lake stretched away beyond the limit of vision to the south east. At points along the shore glacial markings are beautifully shown. Towards the east end of the lake the water discharges into the main stream. Joe would have liked to explore the lake and examine the geology of the vicinity; but time was getting short, and the party hurried on down the river, where a beautiful view appeared before their eyes: gentle slopes rising gradually inland, all covered with grass and low willows. Many cariboo were lazily lying around or feeding amongst the little green bushes, turning their heads, just like cattle in a pasture field, in wonder at the strange apparition of the two canoes. Joe speaks of the scene here, viewed in all the glory of the rising sun, as one of wild but quiet beauty, well worth the hardships of the journey.

For about 44 miles, with varying current, the river flowed through narrow channels, and at

times over beds of boulders packed by the winter ice into an even pavement like a city street. Occasionally it expanded into small lakes. About 15 miles from Big Lake they passed an Eskimo camp of three tents, twenty persons, Ungalluk as the chief man. From them they obtained, in exchange for needles and thimbles, a supply of Eskimo clothing made from reindeer skins to protect the party against the severity of the rapidly approaching winter: also some tallow and dried meat. This was on August 25th. This camp of Eskimos was the limit of the hunting grounds of the Chippewyan Indians, who seldom venture further north, owing to the absence of wood for fire, the severity of the weather, and their fear of the Eskimo.

Four miles from this point, camped between high stony hills, and a rapid stream, they met another Eskimo band with seven large tents and fifty-five people: well stocked with dried cariboo and fresh fish. Here Joe got the very discouraging information that the river on which he was travelling flowed eventually into Chesterfield Inlet, not far from where he had been the year before. But one of the tribe also informed him that he would soon reach a large lake, much larger than Reindeer Lake, known as Yath-Kyed or Snow Lake, which drained north by the Kazan River into Baker Lake, and that he

could portage from this lake across another height of land into a great river which ran into Hudson Bay. Although a little disappointed to learn that the Kazan River did not drain into the Bay, he decided to take the Eskimo's advice, and, obtaining from him a rude map of the proposed route, started down the Kazan to reach, as soon as possible, the wonderful lake about which he had been told.

For many miles the river was a continuous rapid due east, with a few portages, so that they soon reached the camp of a venerable Eskimo Aunah, his hair white with age, who lived with his blind, white-haired wife, just where the river began to turn north again, a distance of about a hundred miles from the previous Eskimo camp. Here they found twenty-seven people; but had no time to stop except to exchange greetings and a few presents. They hurried on for about thirty miles more along a smooth even stream with expansions, and soon arrived at the lake called by the Eskimo Hicoliguah or Snow Lake, where not a vestige of wood was seen. It was somewhere along this last stretch of river that Samuel Hearne crossed the Barren Lands in 1770; but Joe was not able to find any trace of his camp.

Snow Lake was reached on August 31st. It extends from east to west about thirty miles and from latitude 62° to 63° . No land could be seen

towards the south-east from the high points of the large islands scattered throughout the lake. Joe determined the latitude of a small island to be $62^{\circ} 43' 30''$. They pitched camp the first night on a small point near a deep bay where the geological surroundings were particularly interesting; but time was important, and he left the lake with much regret in order to hurry on and arrive at the Bay before winter again set in. Twenty miles below the lake several families were camped on the east bank of the river, which here flowed directly north: and it was learned positively that the Kazan River, on which they were paddling, flowed north into Baker Lake. His two Eskimo guides assured him that this was not the case, but that the river flowed into Hudson Bay. He was in a quandary for some hours, until the guides, after much questioning, acknowledged that there was another river, reached by a portage across the height of land, which flowed east into the Bay. After careful consideration Joe decided to turn east as there was now every indication of a rapidly approaching winter. He was at that time in latitude $63^{\circ} 6'$, the most northerly point reached, quite far enough north to suit him.

Twelve portages were made during the following days, and at the end of the first portage he was fortunate enough to get the sun and de-

termine his latitude, $63^{\circ} 7' 51''$. This was fortunate, because, during the next three weeks they never saw the sun, even for an instant, the weather being stormy and overcast.

The portages averaged about half a mile, although some were over a mile in length. They led across a great, gently sloping, grassy plain. Everywhere the land was wet and marshy, the frozen soil hindering the formation of drainage channels. The subsoil was a pebbly clay with boulders.

On the morning of September 5th, after four days hard portaging and an advance of only a few miles, the party reached Ferguson Lake (called after Mr. Munro-Ferguson), seventeen miles in length and about two in width, general trend south east. Its contour is very irregular, full of deep bays and projecting long points. The shores were covered with grass and sand, the beach usually a wall of boulders. The survey of this lake and adjoining streams was made during a long period of stormy weather, with high east winds blowing over the open plains, dashing the waves against the canoes, and making travel impossible. To add to their discomfort, sleet began to fall. The season was getting late, and Joe decided to push on, storm or no storm. They passed the last Eskimo camp of four tents which were pitched on a grassy ter-

race twenty feet above the river which was beached with boulders. As the river began to grow shallow they portaged, on the advice of their Eskimos, and made a *detour* into the river again. However, they were helped across these portages by six Eskimos who were paid one-third of an ounce of tobacco and six gun caps for each trip across.

The river being again entered they made good progress, although occasionally the men had to wade in the cold water to get the canoes through the rapids. Shortly afterwards they reached another great lake, whose general direction was north and south, and which appeared to be of vast extent, although they were unable to spend a day in examination. Its waters were clear and cold, its elevation about 300 feet above sea level. It perhaps extended a hundred miles from north to south. The beach was sandy or else filled with boulders. The country round about was treeless, with many low grassy plains which showed no sign of underlying rock. Cariboo were very plentiful in the neighbourhood, but there was no fuel to cook the meat and most of the party as yet had not become accustomed to eat it raw.

September 10th brought ice on the pools, but no snow. The stream, after this date, began to widen out, and flowed with a strong current, expanding into many small lakes; but their pro-

gress was again delayed by stormy weather, accompanied by snow, which turned to torrents of rain. A delay of a day and a half was employed in completing their Eskimo vocabulary, under the tuition of their two guides.

They started out once more on September 15th through fog and rain which turned to snow, accompanied by wind, and the travelling for three days was made very disagreeable by continuous winds from the northeast, accompanied by sleet and snow. Old man Boreas was coming from the North. The night of September 17th was a veritable hurricane, so that next morning they were unable to launch their canoes; but on the 18th the wind dropped and at noon that day they reached the mouth of the river, christened by Joe, Ferguson River, after Mr. Munro-Ferguson, his companion, which empties into Neville Bay. At this point they paid off their two Eskimos who hurried back to their home on the Barren Lands, while the party turned south, and assisted by favourable winds and good luck, reached Fort Churchill¹⁰ on October 1st.

As the country was not in a fit state for travel, none of the rivers being frozen over, and little snow on the ground, Joe and his companions were forced to spend two months at Churchill, which period, however, they enjoyed, as Mr.

and Mrs. Lofthouse were kind enough to invite Joe and Mr. Ferguson to live at the Mission House. The time was profitably spent by Joe, who made a geological examination of the district about the Post and inspected the rock formations as closely as possible, besides plotting the survey of the country through which he had just passed on a scale of two miles to the inch. Valuable¹¹ information concerning the opening and closing of navigation in the Bay and sketches of the country lying west of it and east of Reindeer Lake were obtained from an Eskimo named Powow, who was spending the winter at Churchill: and much information was got from Johnny Anderson and Curly Head, two Chipewyan Indians who came in from the interior to trade their furs.

In 1893 Joe had returned from Churchill by following the route used by the Hudson's Bay Company: from Churchill to York Factory on the Nelson River; thence to Oxford and Norway House; a total distance of 900 miles. Accordingly, he thought that he would like to explore a new route leading to Split Lake on the Nelson, thence by Cross Lake to Norway House, a route that was specially interesting as being near the line of the proposed Hudson Bay railway which had been under consideration by the Government for many years. The route by Split

Lake was shorter than the one passing York Factory, by 200 miles. There was no trail from Fort Churchill to Split Lake, as the route had never been travelled; but Joe decided to go that way, and, as soon as the ice took on the River Churchill, on November 10th, he began to make preparations to leave. It was the 28th, however, before everything was packed and ready. Most of the heavy stuff and collections of rocks being left behind, to be brought out by the annual ship of the Company the following year. The total weight of their provisions alone was half a ton, 400 pounds for the men and 600 pounds of white whale refuse for the dogs. At first they travelled on foot beside the dogs, but soon had to take to snowshoes, as they began to reach the region of deep snow. They reached the Nelson River on December 13th after much hardship, and, ascending it, arrived at the trading post of Split Lake on December 15th, eighteen days from Churchill. Here Joe paid off the driver and men, and hired another dog team and driver to go to Norway House, which he reached on Christmas Eve, after an eight days walk over deep snow. On December 29th he hired a fresh team, and, walking along the shore of Lake Winnipeg he reached Dog Head on January 4th, spending New Year's Day *en route*. From this point he drove, with two carioles and one sled, to

Drunken Point, where they engaged a team of horses to take them to Selkirk, which was reached on January 7th. They had walked 725 miles.

It may be said, in conclusion, that great credit is due to Tyrrell for his two trips across the Barren Lands, because he practically directed public attention to that great North country, and mapped out the region through which he travelled with the greatest care and by means of his own astronomical observations. It is true that Samuel Hearne had travelled through portions of the Barren Lands, from time to time; but Hearne was no scientist and his maps are anything but accurate, some of the latitudes being out by 200 miles. George M. Dawson, who was an authority on the geographical and geological work in the North, says that Hearne merely journeyed about with bands of natives over whom he had little or no control: and that his work, from the standpoint of accuracy, has no value. All the more credit therefore should be given to Tyrrell whose observations, both astronomical and geological, although sometimes made under great difficulty and with death staring him in the face, are beyond reproach.

CHAPTER X

A NEW OUTLOOK

“**T**YRRELL-CAREY. On Wednesday, 14th inst., at the residence of the bride’s parents, Gloucester St., by the Rev. W. T. Herridge, assisted by the bride’s father, Joseph Burr Tyrrell, M.A. to Mary Edith, daughter of Rev. G. M. W. Carey of St. John’s, N.B.”

WEDDED AMID FLOWERS

“With lilies and roses and a profusion of other flowers, so banked around them as almost to make a bower of fragrant loveliness, Mr. J. Burr Tyrrell and Miss Mary Edith Carey were made man and wife last evening at the residence of the bride’s father, Rev. G. M. W. Carey.

The wedding was at eight o’clock and the ceremony was performed by Rev. W. T. Herridge, assisted by the bride’s father. The bride, who looked charming, was given away by her cousin, Mr. J. Kerr Osborne of Toronto. Her wedding gown was of white Irish poplin, with trimming of Limerick lace, tulle veil and orange blossoms. She carried a bouquet of white roses and lilies of the valley. She was attended by her sister, Miss Eleanor Carey and her cousin, Miss Helen Stratford of Brantford, as bridesmaids. A particularly fine grandfather’s clock was sent to the happy couple by the staff of the Geological Survey.” *From the Ottawa Citizen*, Feb. 15, 1894.

Joseph Burr Tyrrell was married to Edith Mary Carey, on Saint Valentine’s Day, 1894. He

was then thirty-six years of age. He had lived in Ottawa, for seventeen years, and as far as health went, no one could have been in better shape. He had given his very best to the Civil Service; rose early, worked late, and the position had suited him and his ideas of life.

In the Spring of 1896, he bade goodbye to his family, and once again took to the field, spending the Summer in the unexplored territory north of Lake Winnipeg and west of the Nelson River. He worked hard that season and sent in a valuable report on the great mineral belt, north of The Pas Mission,^{11a} seventy-five miles wide and stretching north an unknown distance which has since become so famous for production of copper, zinc, lead and gold.

Joe reached Ottawa in time to celebrate his birthday that Fall, but was so busy during the following Winter preparing his report and maps and two papers for the meeting of the British Association to be held in Toronto in 1897, that his own affairs sank into the background. During the Summer of 1897, he attended the meeting of this Association for the Advancement of Science and acted as Secretary of the Geographical Section, reading two valuable papers, one entitled¹² "*The Glaciation of North Central Canada*", and the other, "*Natural Resources of the Barren Lands.*"

During the latter part of that Summer he also spent some time on Lake Manitoba and vicinity, on special geological work.

In the beginning of May, 1898, he received instructions from the Director to proceed to the Yukon District and make a survey of its southwest portion, lying between the Lewis River and the Alaska boundary, and to spend a few weeks in the new Klondike district. During the past year there had been a great rush to this inaccessible country on account of gold having been found on some of the tributaries of the Yukon River, and Joe was instructed to do work of a reconnoitring character with the main purpose of ascertaining where the formations and conditions were such as to encourage the search for paying gold deposits, ores of other metals, and coal. Any information obtained would be of great value in directing the operations of prospectors in the following season of 1899, by which time entrance to the Yukon District would probably be comparatively easy.

Joe left Ottawa on May 12th for Vancouver, thence went by steamer to Skagway, to Pyramid Harbour, across the coast range on foot and horseback by the Dalton trail, and down the valley of the Yukon River to Dawson City,¹³ where he arrived on July 16th.

Dawson lies at the junction of the Yukon and the Klondike Rivers, and, as much free gold had been found on the tributaries of these streams, Joe spent a short time on the small streams in the vicinity, investigating the nature of the mining which was being carried on along every creek.

Most of his field notes are technical in character; and I find many interesting items telling of the wonderful richness of the pay dirt in the region which was known to the outside world as the Klondike.

TUESDAY, JULY 19, 1898

Camp at mouth of Big Skookum.

"I saw Joe Irvine scrape up a pan of dirt and pan it out, and there were $40\frac{1}{4}$ ounces of gold in it, largest nugget $1\frac{1}{4}$ ounces. Value about 700 dollars. Another man told me his biggest day had been 864 dollars with a rocker. About 11 p.m., I noticed that the water was turned off from the flume and that Irvine was pulling up the riffles. We went over and watched, until half past one, what was probably the biggest cleanup ever made in the Klondike.

Six pans piled with coarse gold and nuggets, each pan weighing 50 to 60 pounds avoirdupois. Total value possibly 100,000 dollars. This represented the work of twenty men for a week. The gold was carried away and put in the shanty of the owner, Dick Lowe, who had staked the claim of only 89 feet, when acting as a chain man for William Ogilvie, afterwards Gold Commissioner for the Yukon. It turned out to be, though only a fraction of a claim, the richest place in the Klondike."

JULY 23

"On Claim 31, Caribou Creek, a man took from a hole 40 feet square with 3 feet of pay dirt, \$20,000 last summer."

JULY 26, TUESDAY, FRENCH GULCH

"The gold taken from the bottom of the gravel often contains large nuggets. The deposits may have been formed by the meeting of two streams, one flowing down French Gulch, and the other along the edge of the glacier which once went down the valley. I am informed that a man with a rocker will rock two to four tons of dirt in a day; that one man had rocked out \$2,800 in a day, and that in many places a miner could rock out \$1,000 a day. These, however, are not to be taken as averages. The ordinary shoveller who works by the day (of ten hours) gets \$15 a day.

JULY 26, TUESDAY, CHIEF GULCH CREEK

"As we descended the creek and came to Claim 36, we saw a little stir amongst the men, and, going down into the claim, learned that one of the shovellers had just struck a large nugget and handed it to Mr. Stiles, the owner of the claim. This nugget was like a potato, thick and oblong, with well rounded surface. Its weight was $23\frac{9}{16}$ ounces and it was worth about \$400. A large nugget had been found here last year worth \$535 on the spot, being the largest ever found in the Klondike."

And so Joe's diary runs on; gold everywhere he turned, in lumps, in nuggets, in scales and grains like dust. Men walked about Dawson City with their pockets full of gold dust; the educated, the uneducated, washed and unwashed,

black, white, red and yellow; all engaged in the scramble for gold, or else in a scramble to spend it the instant they had it in their grasp.

Joe bade goodbye to Dawson on August 2nd, started south to finish his survey, carrying with him memories of the wonderful wealth he had seen in the Klondike, enough to turn the head of the sanest man, and also, as a souvenir, a little nugget, which had been given to him by Mr. Stiles of Claim 31, and which weighed one and a half ounces, worth probably twenty-five or thirty dollars.

The rest of that Summer was spent in mapping out the country to the south west of Dawson; and, after a most arduous journey through the unexplored country along the Nisling River, during which most of his horses died from lack of proper food, he arrived at Pyramid Harbour on Sunday, September 25th, where he stayed over-night and then left for Skagway next morning. He had travelled on foot and horseback 1,300 miles.

On his return from the Klondike, in 1898, he sent his resignation to the Director.

The end had come, and, on January 1, 1899, he would be a free agent. In fact on that date he left the Service, without any consideration or bonus or anything else, except a dinner which his colleagues gave him shortly before he left.¹⁴ At

that dinner, Joe told his friends that he was going out into the world about which he knew so little, to find out if he was worth more than \$1,800 a year. He had been told that was all he was worth, and he had made up his mind to find out if that were true.

He was in his forty-first year, with a wife and child, no salary, little money, but at least he had the satisfaction of knowing that he still had his self-respect left intact and that, in the future, win or lose, he would have no one to blame or praise but himself.¹⁵

About this time he met Fred Wade, an old college friend, who had been in the Klondike for some time, but who was now on a trip to Ottawa. Wade urged him to come up to the Klondike, and very kindly offered to lend him any money that he might need to help him get there and to start in business as a mining geologist, telling him that it was a big opportunity for him, realizing that his knowledge of Recent clays, sands and gravels might be of great assistance to others as well as himself in locating and recovering the gold from the river gravels.

So, a few mornings later, Joe said goodbye to his wife and little Mary, and started out on his long and frosty journey to the Klondike.¹⁶

CHAPTER XI

SEVEN YEARS IN THE KLONDIKE

ON his way to the West Joe stopped a few days at Winnipeg, where he bought a team of four dogs and a sled, and hired a half-breed, Roderick Thomas, who had been with him on the Barren Lands and who, in addition to his work as driver, was also to act as cook and general aide when they reached the outposts of civilization at the Klondike.

They arrived at Skagway about the beginning of January, after an exceedingly rough passage from Vancouver, and left immediately with their dog team for Dawson City, taking the Chilcoot trail. This trip of over five hundred miles was made without mishap, and the sun was just beginning, after a long winter's rest, to show himself high above the horizon when they arrived one zero evening at Dawson, in the early part of March.

That night Joe and his man stayed at the Fairview Hotel, kept by Miss Belinda Mulroony, well-known to Klondikers; but, when he enquired about his bill next morning and found he

had been taxed twelve dollars apiece, he at once started out with Roderick and the team to look for less costly quarters.

At that period the city was filled to overflowing with miners, gamblers, and desperadoes from every place on earth, most of them English speaking, with a sprinkling of French Canadians, Swedes and Norwegians, a few Japs who worked as cooks, and one or two darkies; no Chinese, as they were not allowed in the camp. Boarding houses of all kinds, good and bad, were bursting with guests; the hotels were charging exorbitant prices; the saloons, sixty in number, had little accommodation even in the form of chairs, and dispensed nothing but liquid refreshment, from gin to champagne, at fifty cents a drink and up, principally up. Of the 25,000 people in Dawson, eight were white women and 100 were mounted police. Meals ran all the way from one to five dollars a meal, the usual charge being two-fifty.

Joe searched the town for the best part of a day and was seriously thinking of putting up his tent at some suitable spot, when he met a carpenter from Ottawa, named Prudhomme, who informed him that he had just built three cabins, one of which he was occupying himself, and that Joe could have one for \$50 a month. The cabins were on Harper Street near the bend of the

Yukon, in the south end of the town, and were well built of logs, with roof of moss and mud. This suited Joe's pocket, so the deal was made, and Joe at once hustled around and bought a stove and some necessary furniture, and before midnight he and his man had put up the stove pipes, made bunks, and arranged their baggage and household goods, and they sat down to a late meal in the little log house, which, although only twelve by sixteen feet and seven feet high, contained for them all the atmosphere of home.

When he had put his cabin in order Joe packed up his blankets, tent, and camping outfit and bought enough grub to last several weeks: then he and his man hitched up the dogs and started out to explore the surrounding country and get acquainted with mining conditions in the Klondike. For two months they moved about, up one creek and down another, pitching their tent each night beside some miner's shack, deep down in the valley of a winding frozen stream whose bed was filled with shining scales of gold; or, out upon the open plain, sheltered by a grove of dark green spruce from the icy blasts that swept down from the Arctic Sea.

Camping in the Summer or the Fall is pleasant work, even in the Winter, amidst a solid bush of forest trees the camper can defy his foes; but, when old Boreas rushes from the

North, across a treeless barren land that stretches to the polar seas, and the winter sun sends forth his cheerless rays, death is ever present with her winding-sheet of snow. Joe's diary during that journey speaks of cold days and colder nights, of frozen cheeks and ears and toes, all forgotten, however, when he retraced his steps and once again reached the glamour of Dawson.

In the early days of Dawson City every saloon was a place of business, where all debts were paid and all contracts, verbal or otherwise, were sealed with the approval of old man Alcohol. A pair of miner's scales hung before the mirror in the centre of every bar, and the barkeeper weighed out nuggets and gold dust with an impartial hand. For the time being he was the trusted representative of Justice, and his word was taken without a doubt.

No games of chance, so dear to those who search and dig for gold, were allowed in the bar room; but, alongside, an ever open door led to an adjoining room, where one might stake his money and lose it on the turning of a card. Day and night the play went on, high stakes, low stakes, poker, craps, dice, faro, and roulette; one coming out, another going in, in a never ending stream. Painted ladies stood beside a favourite miner and made him stake them for a pot of gold. If won, the ladies claimed the money;

if lost, the miner paid the bill. "Heads I win, tails you lose." A great portion of the nuggets and gold dust dug from the frozen soil eventually found its way into the pockets of the painted women of the Klondike.

There was no disorder, the mounted police saw to that; but license was extreme. Anyone could go to the devil in any way he pleased, as long as he obeyed the simple Laws issued by the Chief of the Police. No shooting at, or killing a man, no cheating at cards. Everything else went. Joe told me that he had gone to the Klondike with the fixed habits of a modest, unassuming, amiable fellow, kind to his comrades, with no thought of malice in his soul; but came out, after seven years, devoid of grace and filled with unbelief. It was not quite as bad as that, I am sure; but it must have been pretty bad.

April came and went, and Joe's money was running low; it was necessary for him to get work, so he interviewed the Governor of the Yukon, William Ogilvie,¹⁷ and Gold Commissioner,¹⁸ Senkler, both of whom he knew quite well. But nothing came of these interviews. Then, one fine summer day, a man came up to him in the bar room of the Caribou Hotel and asked him what he would charge to make a report on a claim up Hunker Creek. Joe replied quickly that he

would do it for \$500, although he might have demanded twice that sum, and he was instructed to proceed at once to the claim. That was his first job. He hurried out, completed the work, and, in less than a week, was paid his fee in gold dust in the bar of the aforesaid hotel. It mattered not that the dust was very dirty and the gold not very pure; it was his first earnings, and he was so pleased that, although he could ill afford it, he treated all hands round, and I find in his diary for that date an item, wine and cigars \$18.35. Such was life in Dawson City.

From that day Fortune smiled upon him and work came to him suddenly as the sun comes after a prolonged spell of cloudy weather, and, in less than a month he had half a dozen reports to make, bringing him in many hundreds of dollars, as well as other small jobs which kept the pot boiling in his little cabin home. He must have been rapidly approaching Easy Street, for I find items during the month of September: "Subscription to the Dawson Daily News, \$50 a year, delivered; advertisement, three times a week in ditto, \$10," and so on. Business became so brisk that he turned his cabin into an office, took a partner, Tommy Green, and tacked up a sign board on the front door of the shack, bearing the inscription *Tyrrell and Green, Mining Engineers and Surveyors.*

Tommy Green, his chosen partner, was a full-blooded Mohawk Indian from the Brantford Reserve, a relative of the famous Oronyatekha, a graduate in Science of McGill, an excellent surveyor and mathematician; handsome, reliable, steadfast and brave.

Then Joe, not to be behind in the mining business and to show his faith in the country, bought a claim on Hunker Creek, below Discovery, known in mining parlance as Hunker 39 Below, which he had examined carefully and which showed every sign of being rich in gold. The price of the claim was twenty thousand dollars cash; so Joe, who had no cash to speak of, borrowed the money from the Bank of Commerce and gave a note for one year from date, *at two per cent a month*, which was the usual method of operation for those without ready funds.

He then sent for his wife and child and was looking for another more suitable house when a friend named Dr. Bonnar met him, and asked him if he would go to London, England, as his agent, in connection with some claims on Bonanza, Bonnar to give him a fee of \$1,500, and pay all expenses. The work was to be nominal, as he was required to be present only in case of inquiries about the claims. As a matter of fact, while he was in London that winter, Bonnar never called for his services.

Never having made a trip across the ocean, Joe decided on the spot to accept the offer, and sent out a letter at once to Vancouver to intercept his wife and instruct her to remain there until he arrived. In some way this letter miscarried and one dark night, about the middle of September, his wife and little Mary, then three years old, arrived in Dawson City.

The boat, which had come down the river from Whitehorse, drew up at a dock, black with men; but Mrs. Tyrrell saw no sign of Joe. She was only a girl at the time, twenty-three years old, and had travelled from Nova Scotia to Vancouver and then to Dawson without a stop. Tired out and unbalanced with fatigue and anxiety, she was terrified at her surroundings. However, she was directed to the Fairview Hotel, which was only a few blocks away, and was received by Miss Belinda Mulroony and conducted to a room, which her hostess informed her, was as safe as a church. Mrs. Tyrrell looked about and became still more terrified. The room was boarded with rough lumber and had a bed, table, and some chairs; two doors, one by which she had entered, the other leading to an adjoining room where half a dozen miners with several lady friends were drinking champagne, playing poker and a phonograph simultaneously. There were no locks on either of the doors. The noise and

drunken laughter from the adjoining room, intermingled with the strains of music, suggested Bedlam to Mrs. Tyrrell. She put Mary to bed, however, and sat for some time in terror, expecting every minute that some one would come in and see her there. Finally in despair she took her child in her arms and went to Miss Mulroony, who, after much talk, gave her a more suitable room, with only one door. She placed little Mary once more in bed, and having barricaded the door with all the other articles of furniture in the room, sat down upon a chair, not having the courage to lie down beside her child, and there she sat and watched till morning, while little Mary spent her first night in the Klondike, sleeping peacefully through the din and uproar, drunken laughter, mingled with oaths, the screams of women and the shouts of men, which came from every corner of what seemed to her the toughest hotel on earth.

It was two days before Joe, who had fortunately been delayed by some business on Hunker Creek, heard of his wife's arrival and hurried back. Every day they made excursions through the town, usually on foot, and were greeted on all hands by the population, who were unaccustomed to the strange sight of a man accompanied by a white woman and a little child. Mary was the chief centre of attraction. Little girls, at that

time, were as scarce in Dawson as roses in Greenland. The sight of golden hair, an innocent face, and guileless blue eyes, was something that appealed even to the desperate men who daily dug out gold from the frozen bed of the Klondike.

Bearded miners, some of whom had committed every sin from theft to murder, stopped to talk with little Mary, who, unafraid, held out her hand and won her way into their darkened hearts by lisping out some word of welcome. All kinds of presents were given to her, trinkets, golden nuggets, coins, candies, every kind of food. One miner spent the best part of a day boring holes in poker chips in order to string them into a necklace which Mary wore about her neck.

Here is a story concerning her and a man named Fuller. Fuller had come up the river from Alaska. Little was known of him, except that he had been a friend of J. J. Healy, former sheriff of Montana, usually known as *Dead Shot* Healy. He was a man about fifty years of age, medium height, dark complexioned, silent, reserved, alert and self-reliant. He was always dressed in the latest fashion, carried a gun on his hip as if it was part of himself, and had the reputation of being afraid of nothing on earth. What his history was, no one knew; in fact no one dared to question him about his past. He probably had

some good qualities, but they were carefully concealed from view. He smoked and drank but little, and gambled only for fun. What his object in life was he kept to himself. Perhaps, like many others in Dawson, he had none, and was merely putting in time, drifting along the stream of life like a cake of ice upon the Yukon.

He had prospered since arriving at Dawson, had bought a claim on Franklin Gulch, and was worth a lot of money. He was one of those who had recently given Joe some work: in fact, when Joe went to England, Fuller asked him to act as his agent in the sale of several claims.

One night Joe was sitting in his cabin at a table, making some reports before leaving the city, when suddenly the door opened and Fuller walked in, his hat pulled down on his head, a gun at his hip, his eyes blazing with anger and disgust. He stood in front of Joe, who was quite taken aback, and said "I've finished with you, Tyrrell. It's all up between us."

"What's the matter," Joe blurted out, concerned at the prospect of losing so good a client.

"It's all up between us," replied Fuller. And he emphasized his statement by coming closer, pounding on the table with his fists and waving his hands in the air like a drunken man, although perfectly sober.

He went on raging for some time, when Mrs.

Tyrrell, whom he apparently had not seen, asked him why he did not explain the cause of his anger. Whereupon this sentimental frontiersman, who had the reputation of having killed several men at Juneau, before he went to the Yukon, glared at her like a hyena, and said that Joe had walked by his cabin that day with little Mary and had not brought her in to shake hands with him. Others had shaken hands with her, but he himself had been passed up. He considered this act an insult.

Joe laughed, but his wife took Fuller and led him over to the little cot where Mary was sound asleep, and, putting a candle on a shelf nearby, raised her daughter up and told her to shake hands. Mary with half open eyes said *How do you do* to him and then dropped back asleep, while Fuller took a chair and sat down beside the cot, gazing intently on the sleeping child. Not a word was spoken for some time, then Fuller rose, and turning to Mrs. Tyrrell, said: "I have not seen a little child for years. I am not fit to touch her hand." And immediately, the hardened sinner burst into tears and went out of the shack as quickly as he had entered. Next morning, a large nugget, a rare specimen formed by many crystals^{18a} of gold joined together was found beside Mary's pillow, left by Fuller for her, and which she still has in her possession.

The family left Dawson on the last boat going up the river late in September, and after a very long and uncomfortable trip, during which Mary had a bad attack of pneumonia and nearly died, they reached Skagway, and took boat for Vancouver. On this journey Mary was again loaded with gifts of all kinds: oranges, grapes, nuts and raisins. One miner insisting on presenting her with a large bunch of bananas weighing about fifty pounds.

Joe left his little girl with her grandmother at Ottawa and with his wife crossed the ocean for the first time. After a most enjoyable and busy time in London, Edinburgh, Glasgow and Dublin, Joe visited the home of his ancestors at Edenderry, 30 miles west of Dublin. In his diary he speaks of spending New Year's week there and of being royally treated by his Irish relatives, one of whom, Garrett Tyrrell, afterwards went to the Klondike and stayed with him for several years.

On Thursday, February 15th, he sailed from Liverpool for Halifax and on that date says:

"My journey to Great Britain, though not giving any evidence of immediate returns (on account of the Boer War) will doubtless be beneficial, as I believe that to a certain extent, by my lectures on the Klondike, I have strengthened confidence in the gold fields there and have established some credit in our business."

Leaving his wife in Ottawa, Joe started on March 12th for Dawson and arrived in White Horse on April 2nd; then, with Garrett Tyrrell, whom he had met at Winnipeg, drove by dog team to Dawson over the Chilkoot trail, reaching there Sunday, April 15, 1900.

Immediately afterwards he started up Hunker Creek to 39 Below, where some men had been getting out pay dirt for him during the winter. His first cleanup on May 5th gave him 24 ounces of gold dust: and from then until August his diary contains little else but entries of cleanups, one running as high as 200 ounces.

During that summer he took to Dawson over 1,000 ounces of gold dust and nuggets: so that, at \$16 an ounce he realized over \$16,000.

In addition he made much money by writing reports on claims, settling disputes about boundaries, and occasionally going into court as an expert witness on mining cases, with which, as business increased, the courts were flooded. During 1900 Joe earned at least \$20,000. Of this, however, \$4,000 went in interest to the bank, about \$5,000 in wages, \$1,250 to Garrett Tyrrell, supplies \$3,000, royalty \$598.18, leaving about \$6,000 for himself.

Of course this enabled his wife to live in comfort in Ottawa: in addition he had had a trip to the Old Country free: and also valuable ex-

perience, as well as good food and an unlimited amount of fresh air. In fact during the following winter of 1900-1¹⁹ there was almost too much fresh air: the temperature keeping well below zero all winter and dropping at times so low that most of the oxygen was turned to ozone. It was the worst winter ever known in the Yukon:²⁰ and the effort to keep warm resulted in many fires. One, however, was not due to overheated pipes. It was caused by two ladies throwing lamps at each other in a dispute over a game of poker at the Fairview Hotel: and burned up two blocks, and destroyed many houses. Had it not been for a band of volunteer miners who were urged to action by Miss Belinda Mulroony, the liquid refreshment would have been burnt. As it was, however, this was saved, much to the satisfaction of the citizens of Dawson: and the *Daily News* next morning complimented the brave miners on their good work.

Then Spring came, bringing wild flowers on the hillsides and rushing water in the creeks and streams. Each day the sun rose higher in the sky: by the end of May the Yukon²¹ ice went out to sea: in June the boats were running up and down the river, bringing tourists from every quarter of the globe.

Business was booming in Dawson City, and Joe bought four new claims and acted as agent

for several others, including the B. C. H. concession which afterwards gave him so much trouble.

Money flowed into Joe's pockets in thousands, and then out again, to the banks and stores of Dawson City; but he had at least the pleasure of handling many bags of gold dust and of letting the golden grains run through his fingers. Times were certainly good. Two years had made a dollar bill look small, and, where formerly he had been content to reckon his assets in single figures now they ran to four and sometimes five. It was a great life and a most exciting one.

Sometimes in the quietness of his tent at night, camping out amongst the spruce trees beside a mining claim, Joe used to think the matter over and wonder where all the gold dust went. The banks got much, the saloons and stores got more, the painted ladies most. But where did it all go in the end? Did it travel in a circle or along a straight path? What was a gold mine? Not like the soil which, when tilled, gives forth continuous food to man; but something set apart to urge him on to evil deeds. He was not sure. And then he'd fall asleep as he listened to the gurgling sound of running water washing the sand and mud away to leave behind the shining specks of gold.

Everything looked so promising for the future

that he sent for his brother James who had been his companion on his first trip across the Barren Lands: agreeing to pay him \$5,000 a year, his duties to begin September 1, 1901. So towards the end of August Jim turned up in Dawson and looked after the busines, while Garrett Tyrrell managed the properties on Hunker Creek: Joe leaving Dawson for the East on October 12th to do some business with his clients there and spend a few days at Christmas in the midst of his little family at Ottawa.

He left Dawson on the last boat to Whitehorse, October 12th and reached Skagway October 19th, Seattle October 26th, Ottawa November 8th.

Here is the most interesting item of that time, at least to Joe himself:

WEDNESDAY, DEC. 25, 1901

George Carey Tyrrell, my son, born July 30, 1900, was baptized by Rev. W. T. Herridge at St. Andrew's Church, Ottawa.

After spending a few pleasant weeks in Ottawa, mixing business with pleasure, he returned to Dawson City for the Spring clean-up: and turned in about twenty-five thousand dollars in gold dust to the bank: a little of which went finally into his own purse, but most of it to meet mining obligations, chiefly in connection with the

B. C. H. C. Ltd. At this time Joe's interests were numerous and varied. In addition to his own mining claims, he was manager of the afore-said hydraulic mining company. He had a large share in the Dawson City rink, used for curling and skating in winter time and for prize fights and other exhibitions in summer. He also took a great interest in the Presbyterian Church, to which he subscribed largely and which he attended when he happened to be in town. It was in charge of Rev. Andrew Grant who, in conjunction with Rev. John Pringle at Whitehorse, ministered to the miners of the region. The congregation at Dawson City was always large: the good, the bad, and the indifferent attending with solemn regularity and doubtless receiving from their pastor, a most able man, some comfort in the business of salvation: while they listened to the best of music played by Dr. Boyle, a musical Doctor from Oxford University and an accomplished gentleman, who made a good living by acting as organist on Sundays and, on week nights, by playing the piano in one of the dance halls of Dawson City.

The year 1902 passed quickly and, as it was becoming more evident each day that placer mining by hand labour would soon give way to hydraulic mining by machinery, Joe, in the Spring of 1903, made plans to develop the

concession on Bonanza Creek²² owned by the B.C.H.C. Ltd.: as a result, most of his gold dust in the cleanup of 1903, coming out of his own claims at Hunker Creek, disappeared in the concession as snow in a midday sun. Boilers, pipes, lumber, wages, provisions, ate up his bank deposits until there was nothing left but notes.

In addition to his other troubles he had to fight his way against a libel suit. He had had minor suits about encroachments on boundary lines and other small disputes; but they had been like passing squalls upon a summer sea. This was a real lawsuit, whose heavy shadow hung over his mind for many months even when the sun shone brightest. It arose in a peculiar way. The B.C.H.C. had a stretch of land on Bonanza Creek, two miles and a half in length, obtained in the usual legal way at the office of the Gold Commissioner. Many of the miners objected, for no apparent reason, to the granting of these concessions by the Government. But object they did. The Dawson *Daily News* took up their case with apparent good faith, and, in several articles complained of the injustice of keeping small miners from doing business on these areas. As a matter of fact the Government had put a clause in the Mining Act, for the purpose of developing poor claims, and getting men with capital to work the leaner ground by hydraulic power.

Large concessions were given in order to promote continuous work. Such was the concession of the B.C.H.C., whose manager was Joe Tyrrell. The two owners of the concession lived in Ottawa.

When the discussion about concessions was at its height, the Editor of the Dawson *Daily News* went to Joe and said that if he was given an interest in their concession, he would cease his criticism.

Joe immediately went to the proprietor of the *News*, told him of the Editor's action, and asked him if he approved, whereupon the proprietor said that he would publish Joe's statement in the paper. This was done with the understanding that if Joe proved his statement, the Editor would be dismissed. The Editor then sued for libel. The suit proceeded in due course: and after much trouble, loss of valuable time, and expense, Joe won the suit in August, 1903, and the editor, who shall be nameless (as well as the owners of the concession), was dismissed.

When the owners of the B.C.H.C. were asked to repay Joe for his loss in defending their concession from attack, they replied that it was his own private affair and refused to pay. So he was out about fifteen hundred dollars on that deal.

During the Summer of 1903, however, his life was brightened by a short visit from Mrs.

Tyrrell and Mary, who had now grown to be a big girl, seven years old. As Joe had bought a new two-story house in the town there was ample accommodation for his family, consisting of himself, wife, Mary, and Garrett his cousin, who still was assisting in his mining business. They all spent a few pleasant weeks together and any troubles that he may have had soon became things of the past.

But when his wife and daughter Mary left on the boat in September to return to Ottawa, they left a blank in his life which it seemed harder than usual for him to fill.

For the next two years, his energies were chiefly devoted to protecting and developing the B.C.H.C. as far as his own personal resources would allow. He saw clearly the splendid success that could be realized from the property, which included the ownership of all the water of the upper portion of Bonanza Creek, if he had reasonable financial support. In default of that support, he determined to use his own resources to the utmost to carry out his plans. So that, although money came to him quickly and in large sums, these sums were immediately used to assist in the execution of his plans as manager of the B.C.H.C.

In the Fall of 1904 he decided to go to Ottawa and see the owners of B.C.H.C. He reached

Ottawa in January, 1905, having made a winter trip of four thousand miles: and tried to come to some understanding about the future of the mine: discussed matters freely with the owners, pressed upon them arguments for expansion, and showed them how the mine might be put on a rich paying basis; but got no satisfaction. They would neither develop the concession nor sell it at a reasonable price. They were wealthy men and could afford to let it lie there, unproductive, and pay the dues. It was the old story, so well known to pioneers in the mining business.

He returned to Dawson in the Spring of 1905 and, after an attempt, all through the following summer and even until the snow lay deep upon the ground, to work the mine, finally surrendered his interest and resigned as manager.

He settled all his accounts, packed his personal goods, books, papers and magazines, arranged to have them shipped up the Yukon²³ to Vancouver the following Spring, and departed for Ottawa.

He had spent seven years in the Yukon. Although he had worked hard through the long dreary Arctic nights, exposed to intense cold and sometimes to hunger, he had never complained. If he had not succeeded financially as well as some others, it was not through his own mistakes but on account of the want of support by others.

He had defended the principle of the *concession* and the *concessionaires* of the B.C.H.C. themselves, who had repudiated his efforts on their behalf.

He felt, however, that he was leaving the Yukon with unstained honour. He had never deviated from the path of Duty, had wasted nothing in riotous living, had struggled and fought for the past two years against Fate. But he still had health and strength. That was something for which to be thankful. With all these thoughts jumbled together in his weary brain, he walked over to the Caribou Hotel, one bleak December afternoon, and, with a light step but heavy heart, threw his satchel into the stage for Whitehorse and jumped up in front beside the driver, who, in a jiffy, cracked his long whip: and off they went, as Joe turned his head from one side to another and bade goodbye to the familiar sights of Dawson City. Here is a significant item which I find in his diary.

FRIDAY, DEC. 8, 1905

Left Dawson at 2 p.m. on the stage with Hobo Bill as driver, bound for Whitehorse.

CHAPTER XII

MARKING TIME

JOE found himself once more in Ottawa, perhaps a little older in spirit, certainly much hardened by experience and less trustful of mankind; but still looking forward hopefully to the future.

He took a little journey to the Geological Survey and met his old friend A. P. Low, who was Director and who offered him a good position with a substantial salary; but the idea of returning to the Civil Service had been banished forever from his mind. Then, after several weeks of enforced holidays, he suddenly decided to go to Toronto and try his luck. He had heard that William Mackenzie of the firm of Mackenzie and Mann, railway contractors, had a number of mining claims: perhaps they might need some one to act as consulting engineer. William (afterwards Sir William) Mackenzie was a difficult man to interview. Day after day Joe waited patiently in the ante-room of his office, but failed to see him. Then, one spring morning in April, William Mackenzie came out

of his room, shook hands with Joe, and told him he was busy just at that particular moment but that he would seriously consider the question of engaging him as a mining expert within the next few days. A week passed and then a second, a third: and Joe's spirits were gradually dropped lower from day to day: hope was going fast, and he was seriously thinking of trying his luck elsewhere, when Mackenzie finally appeared one morning in May and told him to call next day, when he would give him his final decision. Sure enough, next day, May 5th, Joe was engaged at a salary of \$3,600 a year and expenses: an office to be provided for him in the Railway building on King and Toronto streets.

Joe reported next morning, eager to begin work; but no room had been assigned to him: and for several days he remained at home, reading and preparing for the great mining work which he hoped to perform under the guidance of Mackenzie and Mann. A week went by and then another: a cheque was given him for a month's salary; but he had no room or status up to date. Finally, after several interviews, and a desperate struggle, he succeeded in obtaining a room with two chairs, a desk, and some bookshelves; and immediately began to get ready for business, which however was very slow in arriving.

As it was in the beginning so it continued dur-

ing Joe's tenure of office. Mining, to William Mackenzie, was of secondary importance. His mind was filled with railway plans and operations: anything else was of little interest. It is true he owned several mines which had come to him in the course of business, some that promised good returns if properly worked, most of them of no intrinsic value; but he gave them scant attention.

Finding that the summer season was gradually slipping away, Joe asked to see William Mackenzie in order to discuss mining, and settle plans for the future: and finally managed to get an interview with his elusive employer. He tried to open up the question of mining several times; but Mackenzie evaded the subject, and persisted in discussing the weather probabilities and civic politics: and then invited Joe to lunch: they spent a pleasant hour together, chatting about the great country to the North and its wonderful prospects. In the end, Joe was as far away from mining as ever.²⁴

Time ran on and eventually some work appeared in view. Joe made several short trips and one longer journey to British Columbia, on mining business, but nothing came of his reports, and the longer he stayed with Mackenzie and Mann the more he realized that the firm looked upon mining, especially that of gold, as a sort of expensive toy.

William Mackenzie was an able man, greatly misunderstood by the public who looked upon him as a grabber of land and as one who had no interest in anything which was not his own. He was, on the contrary, a real pioneer and patriot, fond of his own country and eager for its rapid development; his only fault being a mania for multitudinous activities with no thought however of ultimate personal gain.

All these things Joe learned after many conversations with this remarkable man, who always avoided the question of mining, particularly if it related to gold. Mackenzie was on sure ground when he was discussing railway construction or the building of bridges or the drawing of contracts, but when the conversation turned to mining he evidently felt he was getting near quicksand and skilfully directed his remarks into another channel.

At first Joe did not notice this phase of Mackenzie's nature: it was only after many interviews and lunches where more intimacy obtained, that it dawned slowly but surely on Joe's mind that all the real mining work he would ever do for Mackenzie could be put in a nutshell. Business became very slow and time hung so heavy on his hands that he took refuge in the writing of papers on all sorts of geological subjects. If he was not writing he was thinking about schemes

for the future: when he should have an opportunity of developing some great gold mine. Joe cared little for the mining of the baser metals: and less for silver. He knew that Canada was not yet ready for the production of iron and steel in great quantities: copper and nickel perhaps might some day be of great commercial value: silver, although plentiful in many parts of the country, was subject to great fluctuations in price and in the future might become so cheap as to prevent profitable production. Gold, on the contrary, was the only true standard of all values. There was no danger of it ever becoming a drug on the market. Other things might rise and fall and decay; but it remained ever the same. It was the king of metals and ruled the world. For him, therefore, gold or nothing.

And so he dreamed on and planned from day to day, until gradually his mind wearied of such thought and demanded physical action. He was very fortunate, having a good position and being in receipt of a fair salary; but something urged him to other fields. He was not doing justice to himself. It was not exactly a loafer's job he had, but it might easily become one. The Civil Service had been bad, but this was worse. He felt at times that he was passing through a holy day period such as the Church prescribes for her

priests who grew tired of the world and all that in it is.

At the end of the second year of his enforced holiday or penance he sat down one day and tried to reason the whole question out carefully; his brow became very clouded, and horizontal wrinkles grew upon his forehead: he remained some time in a state of suspense, the wrinkles growing ever deeper; then suddenly a smile passed across his face, he gave a loud laugh: and, rising from his chair with a feeling that his chains were falling off, decided upon quick action. He went downstairs and asked for an interview with his employer, and, for the first time in his experience, luck was with him. He was shewn almost immediately into William Mackenzie's room, where he was greeted with a smile and a welcoming hand.

"I have come to ask you to accept my resignation," said Joe abruptly, giving Mackenzie no opportunity of opening or directing the conversation. "Oh!" replied the latter, taken by surprise, "are you not getting your cheque regularly?" "Yes," said Joe, "I have no complaint on that point." "Well," said Mackenzie, "what's the matter?" "I have nothing to do," blurted out Joe, and words flowed from him in a stream. "I entered your service with the expectation of doing some mining, but, since I have been with

you, I have had no practical work. It is true that I have made reports on several of your mines; but nothing has come of them. In mining affairs you seem to place more reliance on your own judgment than on mine. You engaged me to give you advice: I sit idly by, while you yourself deal in mines."

"What do you want?" interrupted Mackenzie, laughing. "You get your salary, rain or shine: one would think that was enough at present."

"What I want," said Joe, "is work. I have had none here. Time hangs heavy on my hands. My eyes grow dim with looking into the future, and my intellect is getting numb." William Mackenzie was not accustomed to speeches like this. He had been accustomed to dealing with men who placed salary first and work last. To hear a man say he wanted more work in order to earn his daily wage was something new to him. He could not understand it. For a time he sat, unable to reply to such a speech, then began to make suggestions and to hold out hope for the future. But Joe had full knowledge of Mackenzie's promises where they concerned mining, and remained adamant. He had made up his mind to leave, and soon William Mackenzie realized that all his arguments fell on deaf ears. Joe handed him his resignation which he had already prepared: they chatted for a while on

congenial subjects: shook hands and bade one another goodbye. They parted with the best of mutual feelings: William Mackenzie to pursue his long and devious way, strewn with a thousand plans and schemes: while Joe walked downstairs and stepped out on the street, feeling like a bird that had been confined in a gilded cage and had suddenly been set free under the open sky.

CHAPTER XIII

FORTUNA FORTES ADJUVAT

SHORTLY after leaving the employ of Sir William Mackenzie Joe opened an office on his own account and advised the public that he was ready for engagement as a mining engineer and geologist: and during the following two years was more or less successful in obtaining work, principally in the north country, which was being rapidly opened up, and gave great promise of future expansion in the mining of silver, copper, gold.

In 1910 the mining business began to boom and, as a result, Joe began the year with a winter trip to Porcupine to report on several properties. His diary shows that from January until the beginning of July he was continually on the trail. One week at Elk Lake, the next on the Montreal River, then at Quebec, from which he made a trip down the Saint Lawrence as far as Mingan: and finally, on July 3rd he landed at the General Hospital in Ottawa, there to undergo a painful though not serious operation. He was just beginning to get on his feet in August, when

he received a cablegram from London, England, asking him to go over and interview a gentleman named Frecheville, who was one of the Directors of the Anglo French Mining Company, with headquarters in London, doing business all over the world. Joe hesitated at first to answer what seemed to him a peremptory letter, but was persuaded by his wife to swallow his objection: and in his diary, date of August 18, 1910, an entry states that he sailed from Montreal for Bristol on the *Royal Edward*: and that his time on board was passed principally in the company of Sir James P. Whitney, former premier of Ontario, who was extremely interested in the country to the West and South of Hudson Bay, and was anxious to learn something about that district, which was just beginning to be opened up to civilization and about which the people of Ontario and the West were so much concerned. Another entry of September 9th states that he was engaged by the Anglo French Company, at a nominal retaining fee of \$2,000 a year, all expenses paid: and, when he was engaged on special work for the Company he was to receive \$50 a day. Next day he sailed for New York on the *Mauretania*, quite pleased with his contract and with the Company, for whom he worked faithfully, and with whom he had the most friendly relations for the following fifteen years.

Fortune had at length smiled on Joe, this time for good. He was sure of an income of ten or fifteen thousand dollars a year, with prospects of a great deal more. There would be much work involved and difficult travel at various seasons of the year; but that was nothing to him. Summer, winter, heat or cold, were all the same to Joe. He liked work and could not live without it. He liked it all the more when he got a fair reward.

In 1912 Joe made his last journey to Hudson Bay, in connection with some work for the Ontario Government. Sir James Whitney, as Premier, had endeavoured to extend the north-western boundary of Ontario to the south bank of the Nelson; but the Dominion Government and the Manitoba Legislature objected: the inter-provincial boundary being finally set about one hundred miles southeast of the Nelson; the province of Manitoba getting all the land northwest of this, and Ontario the district southeast, known as Patricia.²⁵ But it was agreed that Ontario should have a right of way, five miles in width, to the Nelson River, as well as enough land on the south shore of the stream to establish a townsite, where Port Nelson was finally established as a seaport on the west shore of Hudson Bay. Joe Tyrrell knew Hudson Bay, its tides, and its peculiarities better than any

man alive: and it was probably on this account that Sir James Whitney was anxious to have him act for the Ontario Government and stake out its property in the north.

Joe pointed out the futility of trying to establish a harbour at Port Nelson.²⁶ The site selected for a seaport was in a most exposed position with no natural advantages, on a barren, dreary, inhospitable shore: the building of breakwaters would be almost impossible, owing to the shape of the bay which lay at the mouth of the Nelson, a long narrow funnel, where waters were lashed in winter by gales from the east and north, extending over an open expanse of water for eight hundred miles. But Sir James insisted: and Joe, with a great desire in his heart to see once more the surly waters of the great inland sea, and with the hope also that a trip to the North would rejuvenate his blood and cure his growing rheumatic pains, was persuaded to undertake the work: and, one day in May, set forth on his long journey, armed with a long sheet of parchment which set forth the object of his mission and bore on its face a great flaming seal.

He was accompanied on this trip by Professor Louis B. Stewart, who was a qualified D.L.S., and by W. B. McPherson as chainman. The party proceeded to Selkirk, Manitoba, then to the north end of Lake Winnipeg, and started

down the Nelson River which drains the lake into Hudson Bay: reached Norway House on June 7th, and, after some delay there in an effort to engage expert canoemen, left the post on June 12th, with three canoes, two Indians and one white man being in each canoe. They crossed to the Hayes River, and Professor Stewart surveyed carefully the lower part of this stream while Joe went on to York Factory which lies near its mouth. July 12th saw them both at York Factory, from which point the survey was continued round the peninsula which separates the Hayes from the Nelson River: and finally the land for the proposed townsite was laid out and marked definitely on the southeastern shore of the Nelson. Owing to the advancing season and lack of time it was impossible to stake out the five mile strip which was to run from the Nelson to the northwestern boundary of Patricia; but Joe managed to get a fairly good idea of the character of the country through which it ran. It was about the 20th of August when Professor Stewart and W. B. McPherson left York Factory for home: on the 26th Joe started eastward along the shore of Hudson Bay with an assistant, P. E. Hopkins, who had just arrived on the steamer *Stanley* at York Factory. He reached Fort Severn eight days later and on September 4th began the ascent

of the Severn River. It was September 21st before he reached Trout Lake, where there was a Hudson's Bay post and where he was able to obtain some flour and potatoes but no meat or bacon. From Trout Lake south the journey was very rough, the portages long and tedious and, in many cases, overgrown with heavy brush. On October 13th Joe crossed the height of land which divides the Severn from the Cat River and found himself soon at Cat Lake, where there was another Hudson's Bay post and where he was fortunate enough to secure some fresh bacon, a wonderful change from the decomposed pork on which his party had been living for nearly a month. He also got some tea and sugar. By this time they were on well travelled ground: so they hurried south along the Cat River to Lake St. Joseph, crossed a portage to Root River, down the Root River to Lac Seul and thence to Sioux Lookout, which they reached on October 23rd. From York Factory to Fort Severn and thence to Sioux Lookout Joe had travelled 55 days, over a distance of more than 600 miles, making 86 portages averaging one-third of a mile each, as well as a survey of the whole route and a careful geological examination of the surface of the country passed over.

His report to the Ontario Government was

short and concise but contained much information both agricultural and geological, with many interesting views as well as two valuable maps drawn to scale: and a special section devoted entirely to the rocks of the country through which he passed. It was published in 1913 by the Ontario Bureau of Mines.

The following year was perhaps the busiest and most profitable Joe ever had.

Here is his itinerary:

On January 1st he was in London, consulting with his Company: February finds him in Northern Canada, where he spent most of the Spring: June, he is in Montreal and vicinity looking at lead and zinc mines: July in Vancouver and vicinity: September at Port Arthur: October in the north country again: and on November 15th he appears in London: two weeks of December he spends in Ireland, in Kildare County, at the home of his ancestors: Christmas Day finds him at home in Toronto sitting by his fireside; but next day, at a minute's notice, he is off to the Porcupine and McIntyre mines. Any spare time Joe had on his travels I find from his diary he spent in attending scientific meetings, reading papers, delivering addresses on "Mining in Canada", or in wandering through some Museum or Library in order to add to his stock of knowledge. None of his time was ever wasted.

Throughout the years 1914-8 Joe saw much of the horrors of war in England and Ireland. It was bad enough in Canada where the country was gradually skimmed of its finest citizens, most of them in the flower of their youth; but in England conditions were at their worst. Everyone was put on rations, food was scarce, and every day saw some new horror and brought some terrible news to the inhabitants of the snug little isle.

Joe crossed the ocean²⁷ every year of the war, his most exciting and dangerous voyage being in 1917, when he sailed from New York on the *Aurania* which was carrying American troops. The boat went first to Halifax and then to Sidney where it joined a convoy of nine ships going to Liverpool, thus protecting the vessel with its troops from the terror of the submarine. Joe will never forget that trip and its exciting experiences. His return trip on the *New York*, in January, was even more exciting. The submarine terror was less, but its place was taken by violent winter storms such as only January can produce on the northern coast of Ireland. Gales from the west and south-west piled the seas up mountain high, which broke across the steamer in swirling floods, breaking in cabin doors, flooding staterooms, and washing unfortunate stewards overboard.

He landed in New York glad to be once more on solid ground: and, for a little change, immediately went up town and attended a meeting of the A.I.M.E., where he sat amidst his many mining friends listening to papers on the progress of scientific methods of mining.

Joe passed through the Valley of the Shadow of Death two years ago, and, for several months, was very close to the thin border line which separates the living from the dead. Due to careful nursing, the skill of science, principally to his heritage of a strong and rugged vitality, he recovered, and, in the present year of our Lord, nineteen hundred and thirty, is once more able to mingle with the horde of busy men who daily meet, to talk and plan and lay out schemes for the promotion of mining in the great country to the North.

But, although Joe still takes great interest in the work of mining gold and in the future welfare of his native land his heart has turned, in his declining years, to the pleasures of the farm. His love of fresh air and the open sky, and perhaps an inherited love of the soil, impelled him to purchase a farm on the eastern outskirts of his adopted city: where, amidst a grove of northern pine, he built himself a country house, to which he might retire in time of stress, and soothe his weary eyes and jaded nerves with the

gifts of Nature: green fields and trees, orchards full of bloom: birds singing in the sunlight, robins in the early morn, the whip-poor-will at night: water tumbling over broken rock and stone: while he himself might wander to and fro, digging, hoeing, pruning trees and planting in the Springtime, sowing, reaping, gathering red and golden apples in the fall of the year.

APPENDIX

THE TYRRELL FAMILY IN IRELAND

Everyone has heard of Sir Walter Tyrrell. He is supposed to have killed King William Rufus with an arrow which glanced from an oak tree in the New Forest. But it is now generally established that he had no hand, directly or indirectly, in the King's death; although his flight to France immediately afterwards produced such suspicions against him that, after his return to England, the lion on his coat of arms was cut in two by order of King Henry II. It is difficult for us at the present day to understand the ignominy and disgrace of such an act, then almost equivalent to the cutting off of an ear. The punishment was mitigated somewhat by a free pardon and by the gift to him from the King of a motto for his shield, *Veritas via vite*. This has been the motto of the Tyrrell family ever since.

History tells us that Sir Walter Tyrrell (III) was born in 1070, married Adelaide Giffard, cousin of William the Conqueror, in 1091, joined the First Crusade and was at Jerusalem in 1096, after which he was created a Baron of France and England. He made a final pilgrimage to the Holy Land and died there in 1131. He was succeeded by his son Hugh (I), who joined the Second Crusade in 1146, and died in 1159. It was his son, Sir Hugh Tyrrell (II), who went with his cousin, the Earl of Pembroke, known as Strongbow, into Ireland, to conquer the

district now known as Westmeath, containing about 12,000 Irish acres.

This land, after being conquered, was finally divided up amongst the adherents of Strongbow: and so Sir Hugh Tyrrell appears finally as a real Irishman, being made, in 1183, under the new distribution of the conquered territory, Governor of Castle Knock in Meath. He joined the Third Crusade in 1190 and was present at the siege of Acre. He died in 1199 at his estate in Poix, France, and left to his son Richard, the Red, the barony of Castle Knock: and his son Richard (II) the third Baron of Castle Knock became, in 1240, the Lord of Fertullagh on the death of his uncle.

Hugh, his son, and fourth Baron, was succeeded by Richard (III), who was fifth Baron for the period only of his father's life. It was this Richard who was summoned by King Edward I to the English Parliament on February 23rd, 1302. It is on record, also, that Robert, the sixth Baron, was in Parliament in 1368 and died in 1371. Several of the subsequent issue having died young, we find the Barony next invested in Richard Tyrrell of Fertullagh, in 1404: his grandson, Sir John Tyrrell, built, in 1460, Castle Grange: and may therefore be considered as the ancestor of the Tyrrells of Castle Grange. He was always a friend of England and a prominent supporter of British rule in Ireland: and had a commission to array the men of Westmeath in time of trouble.

Amongst his descendants one of the most noted was Captain Richard Tyrrell, who defeated Barnwell at a place called Tyrrell's Pass. He was one of the few, if not the only member of the Tyrrell family who fought against English rule in Ireland. In 1595 Hugh O'Neill, Earl of Tyrone, made an offer of Ireland to the King of Spain and began a rebellion, which lasted ten or twelve years and

was chiefly directed against the Protestant rule of Queen Elizabeth over the Irish people. O'Neill persuaded numerous gentry to join his cause and one of the most capable was Richard Tyrrell. In the year 1597 the Earl of Tyrone dispatched him with four hundred men to act in Leinster and Munster when he heard that the English were preparing to advance into Ulster.

The Anglo-Irish of Meath, one thousand strong, assembled at Mullingar under Barnwell, Baron of Trimlstown, with a view to joining the Lord Deputy. Tyrrell, having encamped in Fertullagh was joined by O'Connor Faily, and Barnwell despatched his son to take them by surprise; but Richard Tyrrell, making a feint of fleeing, drew him into a defile, and posted half his men in ambush in a hollow at the side of the road; when, at a given signal—the playing of Tyrrell's March—Tyrrell attacked in front and Faily in the rear. Only one soldier escaped, and young Barnwell was taken prisoner.

The site of this fight is known as *Tyrrell's Pass* to this day. After the rebellion was over Richard Tyrrell retired to Spain.

The march used on that occasion was a bagpipe tune, composed by O'Farrell, chief piper to Captain Richard Tyrrell. The air has been transcribed from the musical manuscript of Kane O'Hara, 1750, by Joseph Henry Tyrrell, who compiled a pedigree of the Tyrrell family in 1904. The music is given here.

TYRRELL'S MARCH, 1597

Bagpipe tune

Composed by
O'Farrell, piberre.

Arranged by
Theodore X. Tanner, A.R.C.M.

The musical score is written for piano in G major (one sharp) and 2/4 time. It consists of five systems of music, each with a treble and bass staff. The melody is primarily in the treble staff, while the bass staff provides harmonic support with chords and single notes. Dynamics include *sf* (sforzando) and *f* (forte). The piece concludes with a double bar line.

There was also another Richard Tyrrell, Rear Admiral of the White, born in 1770, whose name appears in the south west area of Westminster Abbey on a tablet bearing the inscription :

“Sacred to the memory of Richard Tyrrell, Esquire, descended from an ancient family in Ireland: died June 26, 1766 Dying on his return to England from the Leeward Islands (on board H.M.S. Princess Louisa) where he had for three years commanded a squadron of His Majesty’s ships his body, was, on his own request, committed to the sea with the proper honours and ceremonies.”

The Clonard Arms are emblazoned on the tablet and on a piece of rock are the words,

“The Sea shall give up her dead and everyone shall be rewarded according to his works.”

Later on, we find Thomas Tyrrell, 1750-1813, a lineal descendant of Sir John Tyrrell, in the ninth generation, who spent his life between his estates at Kilreany and Castle Grange in the County of Kildare. According to J. H. Tyrrell, the historian of the family, this Thomas may be considered as the immediate ancestor of the Tyrrells of Weston, Canada. He was known as the *Fighting Quaker*, and was High Sheriff of Kildare, commanding also all the yeomanry of that county. It was he who successfully defended Clonard, a strategic position on the river Boyne, just on the border between Meath and Kildare, against an array of four thousand rebels with but 27 men of all ranks, including his three sons. A full account of the battle is given in Musgrave’s “History of the rebellion of 1798”.

It is interesting to note that a single-barrelled gun used by Richard Allen, one of the defenders of Clonard, afterwards came into the possession of the Tyrrell family: for

when Richard Allen was shot, he handed his gun to Thomas Tyrrell who retained it as a keepsake and souvenir. He, in turn, handed it down to his son, and eventually it came into the possession of his great grandson, Joseph Burr Tyrrell. Joe's father had it altered at the breech, from a flintlock, and Joe himself used it in his wanderings up and down the Humber sixty years ago, when he was not much higher than the gun itself.

I have before me a little book published in Dublin, 1800: written by a man named Jones: and containing an interesting account of the engagement at Clonard. I give it here because it is authentic and throws some light on the state of the country in the year 1798.

"Clonard is situate about twenty-five miles from Dublin, on the western road leading to Mullingar. Though constituted a post town it is a very small village, consisting of an inn and a few thatched houses; but from its situation, being on the confines of two counties, Kildare and Meath, and having a bridge across the Boyne, which opens a communication from Dublin to Westmeath, thence to Athlone, and Connaught, it must be considered a very important pass in all times of commotion and war.

"On the Dublin side of the town is situate the Mansion House of the Tyrrell family, which at present belongs to John Tyrrell, Esquire. Upon the institution of the yeomanry John Tyrrell was honoured with a commission to raise a corps of cavalry which was afterwards known as the Clonard Cavalry: and his cousin Thomas of Kilreany was appointed Lieutenant. The corps distinguished itself by its unwearied exertions to preserve order in the neighbourhood; but in the spring of 1798, John Tyrrell, the Captain, received positive information that he was to be assassinated: so he departed with his family to England, where he died: the command of the Clonard corps meanwhile being given to Lieutenant Thomas Tyrrell, who had just at this critical period been appointed High Sheriff of Kildare. In this emergency, and hearing that a band of rebels was marching on Clonard, he left his house at

Kilreany, which was about a mile and a half from Clonard, and removed with his family to his cousin's house at Clonard where he mounted a guard of one Sergeant and eighteen men who were to be relieved every week. Thus matters went on for some time when the country becoming still more disturbed, not only on account of the rebels who were known as the United Irishmen but also because of various feuds amongst the rebels themselves; and, finally, apprehensive of an attack on Clonard by massed insurgents, Lieutenant Thomas Tyrrell repaired to Dublin for aid and soon returned with ammunition, muskets, carbines, and a promise of help in case of attack.

"By this time the rebels, forgetting petty feuds, all combined together, collected from various parts of the surrounding district, and marched on Clonard, plundering farms on their way, stealing cattle, and laying the country waste. They were driven back several times and broke up into small detachments; but finally mustering about five hundred men of whom half were cavalry, they advanced upon Clonard Bridge, 11th July 1798, under the command of Colonel Perry and a priest named Kearns. By the time the rebels reached Clonard all the force that Lieutenant Tyrrell could muster was twenty-seven men including his three sons, the eldest of whom was only fifteen.

"The house at Clonard is an old fashioned one, fronting the road, from which it is separated by a high stone wall and a courtyard: having an extensive garden on its right and a sheet of water on the left. As the enemy were expected from the Dublin side, six of the corps including Richard Allen and Thomas Tyrrell the Lieutenant's son, aged fifteen, took possession of an old Turret at the extremity of the garden as it commanded the road. Upon sending munitions to the Turret and stationing other outposts, Lieutenant Tyrrell withdrew into the house with the main body from which he selected the best marksmen and placed them at particular windows, while the others incessantly loaded muskets and carbines for the defenders.

"The firing commenced from the Turret as the rebel cavalry, numbering about three hundred, approached: and young Tyrrell picked off one of the rebel leaders: the hot reception they got evidently threw them into great con-

fusion, as they withdrew for consultation. The infantry, numbering nearly as many, then came up, and began to swarm around the Turret and through the garden; but none succeeded in getting across Clonard Bridge or into the main house.

"Exasperated, they became reckless of life, and finally, with great loss, succeeded in penetrating the lower rooms of the turret, and, failing to dislodge its defenders, carried in loose straw and sticks and set the place on fire. Two of the defenders, one of them young Tyrrell, tried to escape through the smoke but were immediately put to death: the others, including Richard Allen, leaped from a window twenty feet high and were saved by running into the house.

"The enemy then set fire to some of the out-houses and the toll house on the bridge and threw their own dead into the flames to avoid identification. But they in vain tried to approach the main house as they were picked off by the marksmen stationed at the windows. Eventually after six hours fighting, relief came from Dublin and the rebels were dispersed and finally routed. Many of them were killed in flight and their leaders Perry and Father Kearns captured and afterwards tried and executed. The man Kearns, an Irishman, had a peculiar history: and his life illustrates the strange nature of some of the rebels in Ireland which the ordinary normal Christian finds it difficult to understand. He had been on a visit to Paris during the reign of Robespierre and had been seized in the streets by a mob and hanged to a lamp-post. Being, however, both tall and very heavy the lamp-iron, from which he was suspended, gave way, his toes touched the ground, and prevented him strangling: and eventually a physician cut him down and succeeded in saving his life. One would have thought that such a man, saved from the rabble and an ignominious death, would have blessed his Creator all the remaining days of his life. But, what did he do? We find him next in Ireland where he became a priest with a parish at Clonard, an intimate friend apparently of the Tyrrells, welcome at their house, where he had broken bread and eaten salt with them and had been received with all due respect to his clerical function and with the hospitality of an Irish gentleman.

"He had suffered much from the mob and mob rule and from insurrectionary fury and used to disclaim bitterly against all outlawry and pose as a friend of law and order. In fact he was consulted frequently on methods of defense against the rebels and assisted in the councils of the Clonard corps, until it was discovered or suspected that he was acting the part of Judas Iscariot. In the end, before it was fully known that he had been both a traitor and a spy, he fled, and joined the rebel army which marched against Clonard to the cry of "Erin go bragh". It was discovered afterwards that he had been a member of a secret assassinating society for some years in which he was extremely active. He had helped to organize the expedition of the rebels against Clonard and had been giving Perry, their leader, all the information which he had obtained under the guise of friendship and religion."

When the rebellion was over, Kilreany, the house where Thomas Tyrrell lived, was burned: and we hear of him next as living with his eldest son Adam of Castle Grange, where he died in 1811. This son Adam, about whom we have more detailed information, was born January 3rd, 1781, and married, April 3rd, 1804, Anne Jane Shawe. He served three years as High Sheriff of Kildare: and was one of the landed gentry, possessing seven hundred acres of good land and pasture, on which he raised many cattle and stock: his income being about three thousand pounds a year. His wife died in 1834, and he himself in 1841: leaving a family of seven sons and five daughters.

William Tyrrell, born March 5th, 1816, the fifth son of Adam, spent his early days at Castle Grange, and, on the death of his mother, decided to leave Ireland for a foreign land. His uncle, Edward Shawe, was agent for Lord Ponsonby's estate, at that time one of the largest in Ireland: and it was due to his uncle's influence that William decided to go to Canada, where Mr. Frederick Ponsonby had offered him a position as manager of an investment and

colonization company to be established in the growing city of Toronto, (formerly called York,) which company, however, owing to the state of Europe and the financial crash in England and perhaps also in Canada, was never established. William Tyrrell, then aged twenty, proceeded to the port of Liverpool, and waited for a boat to sail to the golden West.

He had intended sailing for Quebec, but, discovering that a small brig with poor accommodation was the next boat for that port, he decided to take a boat for New York, which sailed eventually on May 3rd, 1836. He was fortunate enough to reach New York on June 3rd: a remarkably fast trip considering the time of year.

In a letter home he speaks of the fine trip over the ocean, the steady winds that filled the bulging sails, until it seemed that they must burst: breathing spells of sunny weather, when the surface of the sea was calm and smooth like glass: of the icebergs, cold and white, spreading their chilly atmosphere for miles around: their pinnacled tops stretching to the clouds and glistening with prismatic colours when the sun shone: the most romantic and mysterious forms of Nature which the youthful pioneer had ever seen. The last day out they struck a sandbar, after the pilot had been taken on board; but no damage was done except a broken mast: and that evening the boat landed at New York: and William Tyrrell left immediately for Albany. The trip to Albany by boat took fourteen hours. Thence he went by canal boat to Oswego, a distance of 110 miles: and from Oswego he sailed across Lake Ontario, one hundred miles, to Toronto, which he reached in two days and was glad to get his feet once more on British soil.

He was not much impressed with the city of Toronto, which he describes as low lying and very wet, with muddy streets, not macadamized: and he noticed particularly that the portion of the city near the Bay was only about four

feet above the water level. To the west the land seemed higher and more desirable for settlement.

William Tyrrell for six years moved from place to place in Canada and at one time seriously thought of migrating to Michigan: but his love of British institutions and laws was the deciding influence and he finally decided to remain in British territory. We find him sometimes in Kingston, where he took any employment that offered, as long as it was in the building business: at Brockville where he tells of going with a party of Indians on a trip to shoot deer, and of having raw meat for his meals: then again at Kingston, where he spent the years 1839-40, taking contracts for building stone cottages. In fact we have definite records of his residence in Kingston in 1841, for it was while passing one of the cottages he was building that Lord Sydenham, then Governor of Canada with seat at Kingston, was thrown from his horse on a stone pile and was carried into an adjoining house by William Tyrrell: where it was found that his leg was broken. He never recovered, dying in about two weeks.

We know also that before he went to Kingston he built the original mill on the Humber for a man named William Gamble: the walls of which are still standing and represent what is now known as the *Old Mill*. Not long afterwards, August 7th, 1844, as we find from his diary, he went to board with Rowland Burr, a pioneer in the milling business who was then living at Pine Grove near Burrwick (afterwards known as Woodbridge): and, a year afterwards, on August 7th, 1845, he was married to Elizabeth, third daughter of Rowland Burr.

He then decided to give up wandering and to settle down and make a home for himself and family. So we find him living at Grange Cottage, in Weston, where he remained until 1859, when he built a fine house for himself on the corner of King and North Station Streets, which is still standing (1929).

WILLIAM TYRRELL AND ELIZABETH BURR

The site of this homestead was an old brickyard, which was surrounded by a field containing a multitude of stumps: beyond, a clump of thick woods: in all, about ten acres. William Tyrrell set to work with customary vigour, and the field was soon transformed into a beautiful home. The bricks for the dwelling house were made on the premises and laid with the greatest care: the ground around was cleared of stumps, ploughed and seeded down: out-buildings and barns were quickly erected: and the house finally appeared, surrounded by a beautiful garden, shade trees, flowers, fruit trees, and all those things, tangible and intangible, which help to make a home.

The dwelling itself contained twenty-four rooms. There were three barns, stables for horses and stock, poultry sheds, a two-story carpenter's shop with some machinery, a kitchen garden, lawn, and two deep wells of cold water. The larger barns were framed with heavy 12 by 12 inch timbers. The basement of the dwelling, as was customary in those early days, contained the kitchen, the summer dining room, and a separate dining room for the house attendants. The family ultimately consisted of William and Elizabeth Tyrrell, seven children, Brian Mahan, the farm foreman, William Littlejohn, a gardener with only one arm, two maids and an errand boy—no small number to provide for all the year round.

In addition, numerous friends, farmers driving home, parsons passing by, were always welcomed at William Tyrrell's home at Weston, with the hospitality that comes not always with wealth and high position but springs directly from a kind heart. Not a day passed, winter or summer, spring or fall, that some one did not sit down and break bread with the Squire of Weston. Wanderers on the road, gypsies, tramps were always sure of a meal at his

house: and, in summer, up to the time of his death in 1904, a bench and seats stood outside the kitchen door, under an old apple tree, where food and drink were freely provided for the homeless, ragged, and tanned, who happened to pass that way.

Due to his interest in public affairs, William Tyrrell was, in 1851, elected Councilman in York Township, the largest and most important township in York County, the principal county of Ontario. He continued in this capacity until 1854, and from that time until 1860 was Deputy Reeve of York Township in the united counties of York, Peel and Ontario. He continued as Reeve of York township until 1878, attending regularly the meetings which were held at Eglington, four miles north of Toronto, near the old Montgomery tavern. During these twenty-seven years he was a strong, sagacious and tactful presiding officer for the municipality and was esteemed and respected by all classes of people. He was the first Reeve of Weston after it was incorporated in 1881, serving for two years. For many years he was a Country Squire or Justice of the Peace, serving the public gratuitously. He had a large library of law books with a courtroom and courtyard at his residence, with separate entrance from the dwelling. Here he passed judgment on such cases as came before him. He had financial interests in different lines of business, including at one time a general store and an oil refinery at Weston, and had also interest in various farms and sections of property throughout the adjoining country.

During the fifties he carried on a large business in building and contracting. He erected mills and other buildings in the township and built the Weston Woollen Mills, which were burned twice and rebuilt by him. He built the High School at Weston and the Town Hall: the Institute for the Blind at Brantford in 1872, the establishment of which was

due largely to his own personal efforts: and many bridges, the models of which he made himself. It is interesting to note that one of these models, made of walnut, is still in the possession of his son James W. Tyrrell of Hamilton, a well known engineer: this model is described in Grattan Tyrrell's "History of Bridge Engineering".

In appearance, William Tyrrell was tall and erect, fair complexioned, with blue eyes, and weighed about two hundred pounds. He always dressed punctiliously, wearing a tall silk hat, a long box coat, high black boots, an old-fashioned English stock about his collar, and carried an Irish blackthorn cane.

His habit was to rise at five o'clock in winter and four in summer, retiring promptly at nine, unless something special prevented. He rarely, if ever, used a rocker or soft chair, preferring a stationary one of solid wood. Though accustomed, when younger, in Ireland, like so many old country people, to the use of wines and liquors, he discarded these entirely from his home, for the sake of his children and particularly his wife, who had been brought up in a strictly temperate family. He never used tobacco. All through his life he kept a daily journal which he wrote up every evening. Twice daily his family assembled for Bible reading and prayer, in the morning after breakfast and before retiring at night, the mother reading, after which the father led in prayer. They were, in fact, an old-fashioned, God-fearing family, and always endeavoured to practise in their daily life what they learned from the Bible.

William Tyrrell was kindness personified, even to the animals in his care: too kind, sometimes, for his own worldly advancement, especially in connection with money affairs. He was a great reader of history and biography, and fond of poetry, in spite of his material life as a builder. He was also passionately fond of flowers and

nearly all his leisure time was spent in cultivating them, especially roses, in his garden. He had one of the most beautiful rose gardens around Toronto. In politics he was a conservative and always took an active part in the elections of his country.

Each of his four sons received a university education and each of his daughters a course, with graduation, from the Hamilton or Whitby Ladies' Colleges.

His faults were all on the surface: his chief one being an overwhelming kindness of heart and generosity which often put him at the mercy of unscrupulous acquaintances.

He retired from business in 1883, and for the following twenty years, lived at the homestead, watching and aiding the progress of his sons and daughters. He died at Weston on November 8th, 1904, aged eighty-eight. His wife only lived two years after him and died on August 11th, 1906. Husband and wife are buried together in Mount Pleasant cemetery at Toronto.

William Tyrrell was a kind, devoted father and husband, respected and beloved by all who came in contact with him, yet it is to their mother, the Quaker, Elizabeth Burr, that the children owe many of their sterling qualities of mind: impressed on them and cultivated by a superior soul.

Elizabeth Burr was the third daughter of Rowland Burr and Hester L'Amoreux: the former being a descendant of the Burrs who came with William Penn to Pennsylvania, the family for several generations being members of the Society of Friends or Quakers. On his mother's side Rowland Burr was of Dutch and Quaker descent. Hester L'Amoreux was a descendant on her mother's side from one of the first *Mayflower* settlers: and on her father's side, was descended from a French Huguenot, Joshua L'Amoreux, who, after the massacre of St. Bartholomew, moved from France to New York.

The name L'Amoreux is perpetuated by a little church

situated in York Township, near the Scarboro line: St. Paul's L'Amoureux: where formerly there was a small village of the same name.

Rowland Burr was born in the State of Pennsylvania, in 1798, and moved with his parents to Canada in 1804, where he was married in 1819 to Hester L'Amoureux, by Bishop Strachan. After their marriage they made their home on a farm on Yonge Street near Richmond Hill, in the township of Vaughan, which Mr. Burr had bought. Most of his life was spent in building mills, for himself, or for others. In 1836 he moved to Toronto and for some time lived on what is now known as Elm Street. He then purchased a farm and mill on the Humber, and in succeeding years built many saw mills and flour mills on that river.

It was while living at Burrwick (now Woodbridge) in 1844 that a young man named William Tyrrell became acquainted with his daughter whom he subsequently married in 1845.

Rowland Burr was one of the most noted mill and factory architects of the early days. In his work entitled "Toronto of Old" Dr. Scadding says: "Mr. Burr from early manhood was strongly marked by many of the traits which are held to be characteristic of the speculative and energetic Americans. Unfortunately in some respects he was in advance of his neighbours in the clear perception of the capability of things as seen in the rough, and in a strong desire to initiate works of public utility, broaching schemes occasionally beyond the natural powers of a community in the veriest infancy. He was a born engineer and mechanic, and at a more auspicious time with proper opportunities for training, he would probably have become famed as a local George Stephenson. . . . The mills and factories at Burrwick in Vaughan originated with him, and from him that place took its name."

Rowland Burr died in Toronto, October 6th, 1865, and his

wife went forthwith to live with her daughter at Weston. It is to his grandmother that Joseph Burr Tyrrell owes much of his early training and his subsequent interest in all forms of outdoor life and travel.

The character of the Burr family and particularly of Elizabeth Burr, who married William Tyrrell, may be realized by reading the following letter, written by Rowland Burr to one of his grandsons:

March 8, 1861.

"Dear Grandson and Daughter:

I have great pleasure in congratulating you both on the union this day formed between you by the marriage covenant. Like Zacharias and Elisabeth, may you long live in prospect of a brighter life.

You both have been trained from childhood to useful branches of industry and educated in the scientific schools of our beloved country. You are both branches of the Magistracy of our country who have risen to wealth and influence by the labour of their own hands in agriculture and manufacture, and you have been trained to Christianity from infancy. But, dear children, while I congratulate you on all these blessings and advantages which are very great, allow me to remind you that new duties will now devolve upon each of you, which, if you wish to live a happy and useful life, must not be neglected.

Be in each other's company whenever possible. If there is time, read one to the other by turns. Instead of the reading room have your own books and cultivate conversations about what you read. But especially read the Bible at least once a day together and pray with and for each other and for all who may be in your house and under your care.

The Bible is the best history and guide in the affairs of human life. It will cheer you in affliction and take away the sting of death.

And now please accept of this Bible from your grandfather. Read and remember the sad history of our first parents placed by their Creator in the beautiful Garden of Eden.

Seek and prefer each other's company to that of all others. A great part of the happiness of life consists in little acts of kindness between husband and wife. If these are constantly kept up, you will be happy whether in poverty or wealth.

Then, with regard to the acquisition of wealth. The road to wealth is as easy as the road to market. Indulge in no useless habits, particularly the use of tobacco and all intoxicants. Do not meddle with other people's business. Never go in debt unless for the actual necessities of life and pay without waiting to be asked. Decide on some useful occupation and then apply yourself to it. Do not speculate in uncertainties. Use sunlight as much as possible and candle light as little as will answer your purpose. Never speak an offensive word of anyone, even in jest. Remember that a good name is better than gold. To have friends, do friendly acts to others. Aid all charitable institutions, and especially divide your bread with the poor. And, as you prize life and prosperity, remember the Sabbath day to keep it holy. For half a century I have observed temporal blessings in those who observe this divine command. If you are not members of some Christian church then become members and continue so till death. The church is like a fence to a beautiful garden, beside the comfort and help therein contained.

May God bless you with long and useful lives. And if I should never meet you again until we meet in that great assembly where no excuse can be taken, may you then have on a wedding garment brighter than the ones you now wear.

I remain,

Your affectionate grandfather,

ROWLAND BURR.

I present also a watch to my grandson, so that he may always go home on time."

NOTES

(1) David Thompson was one of the greatest land geographers who ever lived; but, as he worked far from civilization and in an age when newspapers were scarce and personal advertising unknown, little was heard of him, even amongst scientific explorers, until his field notes, consisting of ninety-four books, were rescued from oblivion by J. B. Tyrrell, after much patient labour and research and some personal expense. In 1916 *Thompson's Narrative*, with an introductory life by Tyrrell, was published by the Champlain Society. This gives Thompson's story exactly as written by himself. There is also a sketch of him by W. Stewart Wallace, librarian of the University of Toronto, entitled *By Star and Compass*, and another by Professor C. N. Cochrane.

From a short paper read before the Royal Society of Canada in 1928 by J. B. Tyrrell the following facts are chosen:

David Thompson was born in 1770 and was sent from a London charity school to Fort Churchill in 1784. He had studied a little mathematics and navigation: and learned to take astronomical observations at Cumberland House on the Saskatchewan, whose position he defined with astonishing accuracy, although he was then but twenty years old, and worked under conditions that would paralyze the ordinary scientist. When one remembers that his watch, sextant and candle were his only instruments, and that the only knowledge he had of the localities where he made his observation was derived from his isolated self, the accuracy and thoroughness of his work is marvellous in the extreme, comparable only with that of the famous Newton.

The thoroughness of his river surveys has never been approached. This is true not only of the mighty Columbia and Saskatchewan but of every stream he travelled. His note books describe his exploratory and survey work over an area of more than one million square miles of North Western America. His work is all the more remarkable because not only was his work performed thousands of miles from the confines of civilization but because it was merely a side-line to his activity as a fur trader, first of the Hudson's Bay Company and then of the North-West Company which was afterwards united with its great competitor. He travelled incessantly during spring, summer and fall: sometimes escaping narrowly from death by drowning or starvation. During several winters Thompson had to build houses in which to live, as soon as the snow began to fall. His last winter in the service of the Hudson's Bay Company was spent at Reindeer Lake, the ice on which did not disappear until July 7th. The fort he built there was in what is now the province of Saskatchewan, about three hundred miles from Prince Albert.

A study of his journals shows that on foot, by canoe, and on horseback he covered fifty-five thousand miles. His map includes all the territory between latitudes forty-five and sixty and west longitudes eighty-four and one hundred and twenty-four. He was not satisfied with being a traveller, trader and hunter by day, but was a scientist at night. While others slept or idled, Thompson on clear nights was observing the stars: scrutinizing the jewelled heavens in order to determine his exact position on the surface of the earth on which he roamed. He was known to the Indians as the *Star Man*.

Thompson was a deeply religious man and refused to debauch the Indians by selling them fire-water. He was the first prohibitionist of North America, and, when others were making money by trading alcohol for furs, he kept on

his chosen path. His relation with the Indian tribes was marked by kindly courtesy, and his inquiries into their manners always touched their religious beliefs: so different from most of the traders of the North who, in their daily life amongst the natives, generally sank to a very low plane.

In appearance Thompson was rather short, of stocky build, with immense bodily and mental strength, long black hair cut square across the eyebrows, and piercing black eyes: resembling in many ways John Bunyan and Curran the famous Irish orator.

Like most of the fur traders he married a native girl, daughter of Patrick Small, a North-West trader of Ile a la Crosse. He carried his family with him on many of his journeys, and when he left the West in 1812, never to return, he took all his family with him to live in Eastern Canada. He lived at Terrebonne in Quebec and at Williamstown in Glengarry County in Ontario, where his children increased to a total of thirteen.

Other traders, travellers and explorers, including some who have received titles and scientific honours, abandoned their native families when they returned to civilization; but Thompson was loyal to his half-breed wife and family until the end.

He died in poverty, in his eighty-seventh year, after fifty-eight years of wedded life: and his wife, fifteen years younger than himself, whom he had married when she was a little over fourteen years old, survived him only three months.

No stone marked the grave of this great man until recently the Canadian Historical Association undertook that honourable duty: and the *David Thompson Memorial Fort* at Lake Windermere, B.C., was formally opened and dedicated to the great explorer on August 30th, 1922.

(2) There are many derivations of the word Winnipeg. Some claim that it is derived from two Cree words, win, meaning smoky, and nipi or nipig, meaning water: and that the name was applied to the peculiar appearance of the water of Lake Winnipeg, due to the finely divided clay from the cliffs on the eastern shore. Philologists, however, say that it is one word and means bad water of the Sea: and that Lake Winnipeg means Sea Lake.

(3) The most remarkable bear story which I ever heard was told to me not long ago by Joe. He had just crossed the Red Deer River in Alberta and his men were busy getting supper ready. All that afternoon a discussion had been carried on concerning the habits of bears: how they lived in winter, in summer, in the dry season. While the men were busy preparing the evening meal Joe and his brother were standing near a thick clump of low bushes that grew alongside the river bank. Grattan Tyrrell, Joe's brother, was still talking about bears and finally asked Joe if he knew where bears kept themselves in the dead heat of summer.

Joe said that as far as he knew they lay about in some cool spot probably under thick brush. Then he turned around and pointing to the dense bushes close by remarked: "That is the kind of place where they usually lie": and he walked a step or two and made a kick at the lowest clump of alder. Immediately a huge bear jumped out of the bush, growled at the sight of so many strange men, and ambled off quickly, while the campers were so taken by surprise that they stood like statues with open eyes and mouths. It was the most remarkable coincidence that Joe experienced in all his long career.

(4) The finest specimen of a pothole I know is at the mouth of the Go Home River, Georgian Bay, on Island

127, known to the Ojibway Indians as Qwabikong or High Rock. At the northwesterly end of the island there are four potholes within a radius of ten feet, one partially completed, the other three evidently of greater age. Of these latter the most perfect is four feet in diameter and six feet deep: its horizontal section a perfect circle, and the sides as straight and as vertical as if cut by an expert stone mason. They are situated on a rather level spot, about twenty feet from the water of Georgian Bay and about ten feet above its present level.

As I reside on High Rock during the summer season I have had ample opportunity of examining and studying these potholes. The whole island shows signs of glacial action, and large angular rocks, some weighing many tons, are scattered about in the neighbourhood south of the potholes. Whether these holes were formed by water running from the passing glaciers, or by the eddies of some great prehistoric river is an open question.

The latter supposition seems more probable, however, because of the following evidence. I took the trouble some years ago to empty the particular hole to which I refer: first removing about three feet of water, then a foot of coarse sand and small pebbles mixed with decayed sticks and vegetation: and finally about two feet or more of finer sand which must have lain there for ages, packed tightly on the bottom. Just beneath this layer of sand I saw, when I finished my labours, four stones, polished like marble, which lay on the curved bottom of the pothole, resembling the eggs of some great Dinosaur. These rounded stones were of granite, the largest being oval, almost a perfect ellipsoid weighing about ten pounds, the smallest a sort of oblate spheroid, about two inches by three. I preserved the stones and still have them in my summer house, as they doubtless represent the last of a series of large angular stones which were rotated with great velocity in

the eddy of some immense stream and ground down by mechanical friction with the sides of the pothole. Time is of no importance in Nature, and the process of forming the potholes on High Rock may have taken a thousand or even a million years.

(5) J. W. Tyrrell, the fifth son of the late William Tyrrell, Esq., was born at Weston, Ontario, on the 10th of May, 1863. He received his early education at the Weston High School. Thence he passed to the School of Practical Science, Toronto, from which he graduated in Civil Engineering in May, 1883.

The succeeding two years were spent on Topographical and Geological work on the Lake of the Woods as assistant to Dr. R. Bell, then Chief Geologist of the Canadian Geological Survey.

In April 1885 he received his Certificate as Provincial Land Surveyor for Ontario, and the same Spring obtained the appointment of Hydrographer and Meteorological Observer upon the Dominion Government expedition, under the command of the late Lieut. A. R. Gordon, to Hudson Straits and Bay with which expedition he was connected for the two succeeding years. In February, 1887, he received his commission as Dominion Land Surveyor, and shortly afterwards was offered a position as assistant engineer on the International Railway of Maine (the eastern extension of the C.P.R.)

Upon the construction of this road he remained until its completion in the Autumn of 1888, when he entered into private practice as Engineer and Surveyor in the City of Hamilton.

In June, 1889, he received the degree of "C.E." from the University of Toronto, and one year later was married to Miss Isabel Macdonald, youngest daughter of the late James Macdonald, Esq., retired contractor of Toronto.

Until the spring of 1893 he was occupied with various local engineering works. Then receiving an offer to accompany his brother, J. B. Tyrrell of the Geological Survey, upon an extended exploratory journey through the so-called Barren Lands lying to the West of the Northern portion of Hudson Bay, the spirit of adventure overcame him, and leaving a partner to look after his local practice, he set off with his brother upon one of the most notable of modern explorations covering a distance of 3,200 miles and extending over a period of eight months.

Upon the successful termination of the above journey, J. W. Tyrrell issued a book entitled "Across the Sub-Arctics of Canada", which was so well received that it shortly passed through three editions.

The succeeding seven years were spent in surveying and several branches of engineering work, in various parts of the Dominion. One day when occupied on professional work in a remote section of the Rocky Mountains he received a telegram at the hands of an Indian courier requesting him, on behalf of the Canadian Government, to take charge of an exploration through the country between Great Slave Lake and Hudson Bay. The commission was accepted and the following January, accompanied by C. C. Fairchild, O.L.S., and Archdeacon (now Bishop) Lofthouse as assistants, he set off with dog-sleds, etc., for the North, upon a journey which occupied eleven months, and covered a distance of 4,600 miles. An official report of this journey was published in 1901 by the Department of Interior of Canada.

Upon the successful completion of this undertaking, Mr. Tyrrell set out for the Klondike where he spent a profitable year, in company with his brother, J. B., in the occupations of surveying and mining. Before and since his return from the Klondike he has surveyed and reported upon many propositions (extending from there to Newfoundland), but

was chiefly engaged for several years in surveying new lands for settlement, on behalf of the Canadian Government.

One of his most interesting and fruitful journeys was made in the interests of a private Syndicate, from Prince Albert to the mouth of the Churchill River on the Coast of Hudson Bay, where upon four different occasions he has made extensive surveys, and regarding which he has published much information.

The last mentioned exploration was made in the year 1905 with the object of ascertaining the possibilities of Railway Construction to the Bay. These were reported to be quite feasible, with Fort Churchill as the terminal site. Since the above date, Mr. Tyrrell has spoken many times, and written many articles in favour of the "Hudson Bay Route" and in favour of Fort Churchill as the terminal site.

It is to be regretted that his advice was not given more consideration before six or seven millions of dollars were wasted in an attempt to make York Factory the terminal harbour.

In 1906 J. W. Tyrrell was elected President of the Ontario Land Surveyors Association.

From 1914 to 1918 he was a member of the Hamilton City Council, 3 years as Alderman and 2 years as Controller. He was urged to run for Mayor of the City in 1917, but declined the honour, and at the end of 1918 retired from civic duties in order to devote more time to private business.

He has always been an enthusiastic motorist and was twice elected President of the Hamilton Automobile Club, and for ten years or more has been an active director of the Ontario Motor League.

The first Road Map published by the League was prepared by J. W. Tyrrell, as have also a number of the best and latest maps of the City of Hamilton.

Since his retirement from the City Council, he has been an active member and Chairman of the Hamilton Town Planning Board and in that connection prepared a large Zoning Map of the City.

In 1923 he was elected President of the Hamilton Branch of the Engineering Institute of Canada.

J. W. Tyrrell has two sons, William Charlton and Dr. James Douglas, both of whom were wounded (though not severely) in the Great War, also two daughters, Helen Burr and Mary Isabel, the former being married to Hugh F. Brown, Barrister, and the latter to F. W. Watson of the Firestone Tire Company, Hamilton.

In September, 1928, J. W. (as he is commonly called by most of his friends) had the misfortune to lose his partner in life, but he continues to reside in the old home at 97 Fairholt Road with his married daughter, Helen.

(6) Doobaunt means *water along the shore*, no doubt referring to the great Doobaunt Lake, which was filled with ice even in August, and had only here and there water near the shore line. A full account of the Doobaunt River system is given in the report of J. B. Tyrrell to the Dominion Government (1893).

(7) The Cariboo or Reindeer is the most useful and valuable of all the known varieties of deer, over fifty in number. In different places and at different times of the year they vary in appearance. In summer they are very poor and lean and their coats shaggy; but by the end of July they assume their new coats and are sleek and glossy. By November their skins become grey and white and are at their best. The skin is the finest of all the fur-bearing animals for general use. In fact, the Eskimos are quite satisfied if they have raw meat and a suit of reindeer skins. The carcasses in prime condition will weigh 150 or

250 pounds. Cariboo renew their antlers in a similar manner to other species of deer; but it is a remarkable fact that antlers grow on both male and female, although those of the male are longer. Their roofs are very large in proportion to their weight and, being cloven, spread out when they walk. This peculiarity of construction enables them to travel on crusted snow when other deer would flounder about and perish. They are gregarious and migratory. Their food consists of tree buds, and lichens, in winter, grass and sedges of all kinds in summer. From a commercial point of view the reindeer is highly prized. It is domesticated by the Laplanders and takes the place of the horse, dog and goat of other countries. It is swift and enduring, strong and willing, and can haul a load of several hundred pounds great distances. Not long ago a Lapp drove a reindeer with a load of 300 pounds a distance of 100 miles in a day. It possesses the advantage in ordinary winters of being able to get its food as it travels, pawing beneath the snow. Its meat is excellent, especially in autumn. Reindeer tongues are famous all over the world as one of the greatest delicacies in the way of animal flesh.

(8) The following clipping from a newspaper of August 8, 1929, is very interesting as it shows how the Canadian people are beginning to realize the value of their great country lying to the North:

EXTENSIVE SURVEY MUSK-OX SANCTUARY

Investigator Completes 18 Months' Visit to Barrens.

(Canadian Press Despatch).

Ottawa, Aug. 8.—A wireless message from Baker Lake, Northwest Territories, received to-day at the Department of the Interior, reports that W. H. B. Hoare, one of the department's special investigators, reached that point on Aug. 6, after having concluded his survey of the Thelon musk-ox sanctuary east of Great Slave Lake.

The investigator has been about 18 months in the wilds engaged in this work. He left Ottawa in January, 1928, with a team of six husky dogs, and with these he travelled from the end of steel at McMurray, Alta., to Fort Smith, N.W.T., and thence, with one of the game wardens, A. J. Knox, he went on, via Resolution, to Reliance, the Royal Canadian Mounted Police post at the east end of Great Slave Lake, a distance of 800 miles from railhead. From this point he made repeated trips across the 15,000 square mile area which comprises the preserve, using dog train or canoe, according to the season. He built log cabins at strategic points for the use of wardens in future patrols for the protection of the musk-ox, herds of which were seen during the course of the survey.

Baker Lake, which lies about 300 miles northeast of the eastern edge of the sanctuary, is the inland end of Chesterfield Inlet.

James W. Tyrrell, who accompanied his brother Joe across the barren lands in 1893, made a trip to the land of the musk-ox in 1900, starting from the east side of Great Slave Lake and paddling along the Thelon River.

His account of the musk-ox is both entertaining and of scientific value. It may be found in his book, entitled *Across the Sub-Arctics of Canada*, published in 1908 (third edition).

(9) The following sketch of the history of the Mission at Fort Churchill is given here as it illustrates the well established attitude of the great Company of Hudson Bay towards all extraneous influences, especially those tending to produce any form of definite civilization: an attitude which gained for them, throughout the great North, the distinguishing cognomen *Here Before Christ*.

In 1880 Bishop Horden went from Moose Factory to York and proposed to Mr. Fortescue, one of the chief Factors, the foundation of a Mission at Churchill for the Eskimos, which, however, met with many objections. In

February, 1881, he went to Churchill and stayed there for two months and, while there, determined to establish a Mission for the poor, wretched people of the Barren Lands who were living practically as heathens. He went to England that summer and arranged for its foundation, taking Mr. Lofthouse out with him in 1882 to Great Whale River on the East side of the Bay: so that he might stay there a year and learn the language of the Indians and Eskimos who hunted about the Bay.

In March of 1883, Mr. Lofthouse went from Great Whale to East Main House and then returned to Moose Factory. From there he went to Michipicoten, Winnipeg, and York Factory, studying the dialects of the natives. Bishop Horden had purchased a Mission House in England that year, and it was to have been sent to Churchill, but, owing to letters from Mr. Fortescue, it was not allowed to be sent out on the Company's annual ship to the Bay. Mr. Lofthouse spent that winter, 1883-4, at York Factory, and in August, 1884, walked along the coast from York to Churchill, where he expected to meet his future wife who was to have come out on the Company's ship, to be married to him that year.

But, though she was all ready to start, the Company refused to allow her passage. Lofthouse then returned to York and there found a telegram stating that she had not been permitted to go. In the summer of 1885 he walked again to Churchill, met his finance, who had arrived on the Hudson's Bay Company's ship, was married by the Captain of the *Alert*, with J. W. Tyrrell as one of the witnesses, and returned to York. While there, the *Alert*, a Dominion Government steamer, arrived with lumber for the Mission House at Churchill, provided by the leading lumbermen of Ottawa, which was thrown on the shore and left there, although the Hudson's Bay people had promised to pile it properly. Finally, in 1886, Mr. Loft-

house and his wife moved to the Mission at Churchill and lived in a small iron house 16 by 20, which had been sent from York some years before for the Company. In the end, the lumber was brought by the *Alert* from York to Churchill: and, for a few days the ship's carpenter and a few of his men helped Mr. Lofthouse to erect the framing: the rest he had to do with his own hands. In 1891 he received a new Church House which was framed in England. This he erected himself, being unable to obtain aid.

When Tyrrell was there in 1893 the resident population of Churchill was 49. Its transient population consisted of 16 Crees, 100 Chippewyans, 150 Eskimos. The people at the Fort, including all the Crees and Chippewyans and a few of the Eskimos, could read and write.

(10) Fort Churchill, in 1894, consisted of an Anglican church and mission and Hudson's Bay store, situated on the west side of the tidal lagoon at the mouth of the Churchill River, on an old stony beach a few feet above the level of high tide.

Every year a steamer of the Hudson's Bay Company came from England and made a call there, to collect furs and leave supplies for the ensuing year. Many ships in the past have spent the winter there but on account of the severe arctic weather and ice-bound coast no exploration seems to have been conducted except to identify points along the shore: the details of which were not always accurate. Prior to 1893 no white man attempted to travel along the coast in canoes, at least, north of Fort Churchill.

The history of the region, which extends backward over two hundred years, consists in the arrival and departure of ships from different outside countries, with an occasional story of tragedy, death by starvation, treachery or disease. The most conspicuous object on the river itself is the building which lies five miles below the Post, on a bleak,

barren rock exposed to winter storms from all directions. It is known as Fort Prince of Wales, and was begun in 1733 by Joseph Robson, an engineer of the Hudson's Bay Company. It is right at the entrance of Churchill harbour. The work of building was carried on for many years by a clerk of the Hudson's Bay Company, Samuel Hearne, the famous explorer, who crossed the Barren Lands to look for the Coppermine River in 1769, but was deserted by his Indians and obliged to return. Another trip was made by him in 1770, but he was again unsuccessful. On a third journey in 1771 he was successful in reaching the Coppermine, July 1772. Being more of a voyageur than a scientist his observations for latitude on these trips were not very accurate.

Fort Prince of Wales was built in the form of a square, each side being 316 feet in length, with walls 30 feet thick at the bottom and 20 feet at the top. It was provided with bastions at the corners and fortified with 42 guns. An inner fort of stone was constructed in which Hearne and his men lived during the long arctic winters. The Fort was captured in 1782 by La Perouse, who sailed up and destroyed it, and carried Hearne and all his furs to France. As La Perouse left it, it remained. When Tyrrell saw it the mortar was beginning to crumble, the guns were still lying about, dismantled, spiked and rusted, although in the centre building some of the wooden beams still remained. It stands at the present day, abandoned and desolate, a most remarkable illustration of the futility of human endeavour.

The Hudson's Bay Company, which was founded in May 2nd, 1670, has been doing business ever since. A report of their annual meeting held in London, June 25th, 1929, shows that their net profit for the preceding year was £475,000.

The following extracts from the President's address are interesting as showing the foresight of this great company:

"We think Edmonton, as the gateway to the North, has a great future, but it is only by thus making our property approachable and attractive, and by assisting in its development, that we can hope to bring buyers to our market."

"Our largest interest lies in the city of Edmonton, where we still hold acres north of the railway, but within the city limits. There we have, by an exchange with the city, consolidated as far as it was possible to do so, our unsold lots. We have contributed to the cost of a subway under the railway which had been a barrier to road traffic; in one section we have paved the streets; provided for the supply of gas and electricity, and planted trees. We have also concluded an agreement with the city under which certain other streets and public spaces may be closed so as to enable us to lay out a golf course.

It is in these ways that we have spent the sum transferred to the Land Account from the Reserve created for such improvements some years ago.

All our sales in this area are subject to building restrictions of a reasonable nature so as to preserve the amenities of the neighbourhood, and we are considering a limited scheme for building loans which has proved successful elsewhere."

HUDSON BAY ROUTE

"The steady invasion by travellers and prospectors of regions regarded hitherto as remote, is a noteworthy feature of the present time and a precursor of change. The last section of railway from the Prairie Lands to Hudson Bay, projected so long ago, reached Churchill on the 29th March. The temporary roadbed laid on the frozen soil is now being replaced by the permanent way, and in a few months the line will be ready for general use, but a much longer interval must elapse before the port works are sufficiently advanced to take care of traffic. The opening of this channel of communication will have important consequences, since it shortens the distance from Great Britain to the centre of

the North American Continent. Originally, the line was designed as an outlet for grain, but that was many years ago, before the Canadian Pacific Railway, and later on the Canadian National Railway, together with the Elevator Companies, had perfected the intricate system of collection, storage and transport, by routes open for a much longer period of the year than that via Hudson Bay. Nevertheless this new line has already justified the courage and faith of the Minister of Railways by the opening up of rich mineral areas, and in my opinion, it will have another result of wider consequence to British trade. For, as it shortens the overland haul from the ocean to the central parts of North America, it will draw an inflow of merchandise through Churchill, not to Canada only, but to the United States as well. And, if we narrow our outlook to our own immediate concerns, it is of importance to us, since it opens up the North.

With this new era before us, comes the need for transformation in the conduct of your Fur Trade, but as it comes, so we believe we shall be ready."

The latitude of Fort Churchill is $58^{\circ} 44'$ north.

(11) Tyrrell obtained from the clerk at the Hudson's Bay store data with reference to the opening and closing of navigation. The harbour opens suddenly in Spring when the ice breaks up in the lagoons and goes out of the river with the tide. It closes more gradually, freezing from the shore to the middle. Usually, by the beginning of June all the ice is gone and in the first week of November makes fast again. From a table of dates extending as far back as 1824 he computed the average opening day as June 19th and the average closing day November 19th. Sometimes it has opened as early as June 5th, and has closed as late as December 4th. The longest period when navigation was possible extended over five months and eighteen days, in 1846; and the shortest four months and eight days in 1838. Thus it will be seen that if averages count for anything the harbour can be relied upon for navigation at

least four months, or for some period between four and five.

(11a) Twenty years ago The Pas was a little mission on the banks of the Saskatchewan, with a population consisting of a handful of Indians and half-breeds, engaged in the business of trapping. To-day it is a modern town with all the conveniences and comforts of civilization.

I have before me a beautifully designed and illustrated pamphlet issued by the Board of Trade of the *Gateway to Northern Manitoba*, from which I take the following information:

In 1910 when The Pas townsite was placed on the market the total population was twenty. To-day it is estimated at 5,000. From a mere mission it has become, in a few years, a modernized pioneer town: being electrically lighted, with sewers and water on the principal streets: a telephone service: churches, schools, stores and fine hospital, the cost of which was half a million dollars: a rink for hockey and skating: and a golf course of nine holes.

Present interest in Northern Manitoba is largely centred upon the mineral wealth, which gives promise of being the greatest in the world. The Pas mineral belt beginning fifty miles north of the city and extending, with occasional interruptions, northward along the western shore of Hudson Bay, is part of the great Canadian shield which traverses the northern parts of Quebec, Ontario, and the Prairie provinces. It is a Pre-Cambrian formation of igneous rocks, granite and gneiss, of great geological age, weathering and crumbling very slowly. Up to the present gold, silver, lead and zinc have been found. Marble deposits are also being marked at Mile 39 on the Hudson Bay railway which has recently been extended to Fort Churchill on the Bay. The great Flin-Flon mine has one of the largest copper-zinc deposits in the world. It is reached by rail from The Pas, a distance of 87 miles.

The agricultural value of the district may be seen from the fact that one hundred miles north of The Pas, the Hudson Bay Railway crosses a clay belt one hundred miles in width and containing over a million acres of fine land. Experimental stations at several points in this area have demonstrated that all grains grow luxuriantly, ripening before frost and yielding bountifully. The rapid growth of farm and garden products is due to long hours of sunshine, the proximity of large streams and lakes, and the consequent absence of early frosts.

Northern Manitoba is a water-power country: rapids and falls of economic value being found on many of the great rivers and streams which flow in all directions through the vast region. The Nelson River is capable alone of developing nearly three million horsepower. As a tourist region the country north of The Pas is unsurpassed.

The distance by rail from Winnipeg to The Pas is 483 miles: from The Pas to Fort Churchill 510 miles, by the completed Hudson Bay Railway.

From a newspaper clipping of October 15, 1929, the following item is taken, showing how the town has developed:

"The Pas has no Little Theatre but it has its amateur theatricals and they are enthusiastically supported. The old-time melodramas and wild westerns once so popular, or at least supposedly so, in all the frontier mining towns, have given way to the modern, elaborate musical comedy. The steady influx of business and professional people from the east has brought the "big city" idea of the theatre to The Pas. Last spring a local company produced a musical extravaganza, "Let's Go", featuring local dancing girls in cabaret costumes, and the house was sold out for three nights."

From another of a later date I take the following items:

"Although north of 53, The Pas has its social life the

same as other towns and cities. And, contrary to the general belief, social life at this northland capital does not consist of dog racing, skiing and snowshoeing with the occasional barn dance or housewarming. There are just as many dancing clubs, bridge clubs and literary societies here as there are in any town in Ontario with a population under 5,000. Every day the social columns of the local daily newspaper chronicle the affairs of the town's society.

Beauty parlors, hair dressing shops and exclusive ladies' wear stores are flourishing in The Pas. Much has been written of the northern air which "makes the cheeks bloom as the rose" but drug stores, of which there are more than a dozen, do a roaring trade in cosmetics. Sun tan had its vogue here at the same time as in Toronto and most of it was artificial in spite of the excellent sample of natural shading afforded by the Indian women just across the Saskatchewan River."

It may be said here that Pas is not a French word and has nothing to do with foot or footstep as is popularly supposed. The word takes its origin from an Indian name *Opasquia* or *Opasquiow*, meaning a gap between hills, referring to the sandy hills on each side of the Saskatchewan, where the Pas is situated.

Here is one of Tyrrell's field notes with reference to the great district lying west of the Nelson River as far as longitude 100° 30' and stretching from the north end of Lake Winnipeg to latitude 56°.

"The country is generally covered with a coating of stratified clay, varying in thickness from a few feet up to one hundred feet. The clay is much the same in character as that of the Red River valley, having been, like it, deposited on the bed of the old post-glacial lake that once covered the basin of Lake Winnipeg. This soil is rich and fertile, and, since summer frosts do not seem to be prevalent, the country will doubtless produce in abundance the hardier roots and cereals grown further south. If the

country were made accessible by a railway passing through it to Hudson Bay it would certainly support a considerable agricultural population."

(12) The paper on the *Glaciation of North Central Canada* was read at the B.A.A.S. in Toronto, August, 1897, and appears in their proceedings of that year. It was also published in the *Journal of Geology*, February, 1898, vol. 6.

It contained a summary of his observations on the glacial geology of Canada up to that date. His interpretation of these observations revolutionized the glacial theories as applied to the Continent of North America, and marked the beginning of a new epoch in the study of its glacial history. It was recognized by geologists of every country as a very important contribution to scientific knowledge and put him in the front rank of the geologists of the world.

The paper on the *Barren Lands* was a valuable contribution to Science and was highly praised by many leading magazines and daily papers. It was published in the proceedings of the B.A.A.S. for 1897, and also in the *Scottish Geographical Magazine*, March, 1899.

Among the friendships formed at that meeting was that of Lord Kelvin, the great physicist, who took a great interest in the geology of Canada. Joe treasures six volumes of his writings which Lord Kelvin subsequently sent him with his autograph.

(13) Dawson City, latitude $64^{\circ} 04'$, lies on a terrace, formerly an ancient marsh, in the form of an arc of a circle, sheltered on the north and east by a high range of hills: bounded on the south by the Klondike River, and on the west by the Yukon. Its main streets run parallel to the latter stream, which is about a mile wide and very deep in the vicinity of the city.

The street facing the river and docks is called Front Street, the next parallel street, Second Street, and so on.

Other streets run at right angles to the main streets. The soil beneath is frozen, winter and summer, to the depth of one hundred or more feet.

During the first rush to the Klondike in 1898-99 the buildings were nearly all of logs or rough lumber, thatched with moss and mud. No electric light, gas, water supply or sewage disposal plant. Dog teams and men carried water about the town. No telephone service, local or outside. Everything was primitive in the extreme. Men travelling carried their blankets and grub: the roadhouses supplying only bunks in which to sleep. Meals were usually of dried eggs, pork, bread of all colours, tea. Stoves burned wood. The only places where one could get real warmth in Dawson City were the saloons, and the barracks of the Salvation Army where one might sit in comfort and read all the latest magazines and papers. Even the gaol was cheerless and icy cold. The population of Dawson in 1929 was only 600.

The city is named after George Mercer Dawson, Director of the Geological Survey from 1895 to 1901.

(14) I may say here that this address to his colleagues opened up their eyes and minds: they realized suddenly that they were not getting even a *quid pro quo* from the Government in the way of salary: within a year, many of the best men in the Geological Survey followed Joe's trail and resigned: as a result, the Service was demoralized, and the Government was forced to pay larger salaries for smaller men.

Some said at the time that the Government in power were not in favour of spending much more money in the North; but on that point there appears to be no direct evidence. It is true, however, that Joe's second journey across the Barren Lands was financed, not alone by the Dominion Government, but also by Lord Aberdeen, who was

much interested in the development of Northern Canada, and Munro Ferguson, his aide-de-camp. It was Ferguson who went as assistant on that trip and Tyrrell gave his name to the great river which flows into Hudson Bay north of Churchill.

(15) That Joe's services were recognized abroad is proved by the following extract from the London *Times* of December 5, 1898:

"No greater testimony to the prospects of the Klondike, as a gold-producing country, could be afforded than by the fact that Mr. J. B. Tyrrell has just retired from the Geological Survey of Canada to engage in business as a mining engineer in the Klondike district. Mr. Tyrrell has spent the last 15 years investigating the mineral resources of Northwestern Canada, and much of the knowledge which is possessed of the possible wealth of its more remote regions is the result of his patient and untiring labours. Last summer Mr. Tyrrell's field of labour was in the Klondike region, and its vicinity. A few years ago the *Times* gave an account of his famous journey across the Barren Lands, when he travelled more than 3,000 miles in canoes and on snowshoes through country previously untravelled by man. For this Mr. Tyrrell received a diploma and the Back award from the Royal Geographical Society. He thus brings to his work a wealth of information on the geological conditions that prevail in northern countries, and on the conditions that doubtless prevailed when the gold-bearing placers were deposited, such as is possessed by very few living geologists or mining engineers. He is a man of very powerful physique, and in the prime of life, patient and careful in investigation, and fearless, though cautious and conservative in his statement of results."

(16) Joe's first home where he and his young wife spent five happy years of their married life, and where Mary, their first child, was born, was a low red brick house in New Edinborough, a suburb of Ottawa, surrounded by a beautiful garden, and concealed from the road by high

bushes of syringa and honeysuckle that, in the spring, were a mass of bloom. The house had formerly been owned by Colonel Brown Chamberlain. Mrs. Chamberlain was a daughter of Mrs. Trail, one of the Strickland sisters, and here she and her mother had cultivated the garden of wild flowers and had written and painted the beautiful book on *Canadian Wild Flowers*, that is now so rare and almost priceless. The dining room was a long low room, one side lined with bookcases reaching to the ceiling, and here Joe and his wife arranged his library, containing many priceless old records of Canadian history.

On the walls were trophies of his travels; but his wife always said that the most precious amongst them all were the Hudson Bay snowshoes on which Joe had walked 1,000 miles from Churchill to Winnipeg. They are still treasured in the Tyrrell family and hold a place of honour in the home at Walmer Road. In this New Edinburgh house was a big drawing-room with a huge open fireplace, around which many of Joe's friends were accustomed to gather on Winter nights.

Among the first visitors to stay with the Tyrrells in this home were Bishop and Mrs. Lofthouse, who had made the long trip from Churchill on Hudson Bay, by York Boat and Canoe, on their first leave to England.

Other interesting visitors were Selous, the African lion hunter and explorer; Prince Kropotkin, the Russian geologist; and Sir Wilfred Grenfell, the hero of Labrador.

During all the time Joe lived in Ottawa he took a keen interest in military affairs and was an officer in the Governor General's Foot Guards. His Company grew, and men from the New Edinburgh district joined until it became the largest and best in the Battalion.

The social and official side was of little interest to him, though he was often Officer in Charge at openings, and on duty at Drawing Rooms and at Government House in

charge of the Guard of Honour. He was in the Guards till he left Ottawa for the Yukon.

WILLIAM OGILVIE, 1846-1912

(17) Land Surveyor, Explorer, Astronomer, Dominion Public Servant. Scotch-Irish origin. Son of the late James and Margaret Halliday. Born, Ottawa, April 7th, 1846. Educated local schools Ottawa and Gloucester township. Married, (1st) to Mary Ann Sparks, who died 1903. Married (2nd) Miss O. P. Richardson. Articled to Robert Sparks, Land Surveyor. Entered Government Service in 1876 on subdivision work in Manitoba and Saskatchewan. His ability was soon recognized, and it can be said that he was one of the real pioneers of that great region west and north of the Great Lakes and the James Bay country. He determined two of the principal meridians on which the map of the Northwest Territory depends. He led an exploratory expedition into the Peace River Country to report on the Peace River Block. He was then employed in British Columbia in connection with the Government survey of the Canadian Pacific Railway and was only a few miles away when Donald Smith drove the golden spike at Craigellechie. In the spring of 1887 he left Ottawa to determine the 141st Meridian, the boundary between Alaska and Canada. He left civilization where Skagway now stands, and made the first authentic trip over the White Pass, which he named after the then Minister of the Interior—The Hon. Thomas White. He arrived near the boundary in the early fall and at once proceeded to erect his observatory and prepare for the long winter observations which were carried out during the winter months. So well was this work done that when the boundary was finally determined exactly, some 20 years later, with the benefit of telegraphic communication, it was found that Mr. Ogilvie's determination was only 370 feet from the

correct position. Having in mind the conditions under which the work was done, and the methods which had to be employed by Mr. Ogilvie, the astronomical world recognized that he performed a work of exceptional merit and skill. Mr. Ogilvie carried a micrometer transit survey from the Pacific coast down the Yukon River, up the Tatondue and down the Bell river, thence up the McKenzie River to above Fort Chipawayan, where he tied into a survey he had completed several seasons before. This survey of 2,700 miles—through a territory much of which had never before been trodden by a white man—added more to the map of Canada than any other single expedition, and in recognition of it he was granted the Murchison Medal by the Royal Geographical Society, for 1891—the first to be granted to any Canadian. Mr. Ogilvie also took an observation on the midnight sun, the first D.L.S. to perform this operation in Canada. He then made an exploratory trip to the James Bay over the old French transportation route, and his report is the first modern account of this country. He determined the Ontario-Quebec Boundary at both Temiscaming and the James Bay.

In 1892 he started work on the Alaska Boundary Commission to determine the boundary along the coast strip and British Columbia. In the spring of 1895 he returned to what is now the Klondike to check up on the work he had performed 10 years before. He arrived inside in time to be present when Bob Henderson discovered gold on Bonanza Creek, which was the beginning of the great Klondike Rush. Mr. Ogilvie immediately became the government, and with a few Northwest Mounted Police, the sole representative of the Crown. He continued to carry on until relieved by Major Walsh. Mr. Ogilvie returned to Ottawa, where he completed his reports, etc. He then made a trip to London on Government business. It was at this time that his services were formally recognized by parlia-

ment, when a formal expression of appreciation of the invaluable services he had rendered to the Government was passed, accompanied by a vote of \$5,000.

In the spring of 1898 he returned to the Yukon as commissioner, a position which he held with great distinction and which carried that country through all of its formative stage. He resigned in 1901 and passed some time in the south on account of his health, which was seriously undermined as a result of his many years rigorous service. He returned to Government Service in 1910 in connection with reclaiming land along the present Hudson Bay Railway. Mr. Ogilvie died November 12, 1912, in Winnipeg, as a result of ptomaine poisoning contracted in the field.

He is the author of several magazine articles concerning the lands he explored, and his one book "Early Days On the Yukon" is recognized as the first page of the history of that interesting country. His departmental reports on his various expeditions are all recognized as authority, and combined they place William Ogilvie in a class with his great forerunners Alexander McKenzie and Simon Fraser.

Among the lasting monuments to his memory are the "Ogilvie Bridge" across the Klondike River, and the "Ogilvie Range of Mountains" northeast of Dawson City. The United States paid national tribute to his high integrity by naming the highest peak on the Alaskan side of the International Boundary, "Mount Ogilvie".

NOTE OF E. C. SENKLER

(18) E. C. Senkler, the son of Judge Senkler, of St. Catharines and grandson of Rev. E. J. Senkler, a well-known examiner in Mathematics in the early days of the University of Toronto and a graduate of Cambridge. He took the degree of B.A. in 1888 and then entered Osgoode Hall. He was a famous football player and all-round athlete. He went to the Yukon in 1898 and remained there

during the great gold rush. He is at the present time Secretary of the British Columbia Law Society.

(18a) Gold crystallizes in the regular or cubical system: as a cube, octahedron or rhombic dodecahedron. It is seldom found in a perfect crystalline form, some of the edges or corners usually being truncated: and often the crystals are crowded together in a conglomerate mass.

The specimen which Fuller gave to little Mary Tyrrell was what is known as a twin crystal.

One of the most perfect cubical crystals ever found anywhere was obtained one morning by Joe at the counter of the Bank of Commerce in Dawson City, during the Spring clean-up of 1903. He had entered the office to dispose of some gold-dust and was standing at the counter, when his eye fell upon some nuggets which the clerk was weighing out. Reaching over, he took one up and told the clerk he wanted it as a specimen: and, after a little argument, the clerk weighed it and Joe thereupon paid for it in dust: thus preserving one of the finest specimens of a cubical crystal of gold to be found in the world.

Joe kept his crystal cube of gold all through the vicissitudes of the subsequent lean years, and still has it, along with other souvenirs of his life in the Klondike.

(19) Sergeant Major Tucker of the N.W.M.P., who was the weather representative at Dawson in 1900-1, gave the following information concerning temperatures to the Dawson *Daily News*. The temperatures were recorded by standard thermometers of the best Negretti and Zambra type. The cold spell began in October, the first day of which showed a minimum of five below zero. Every day but one of November showed a minimum of twenty or more below. December's average minimum ran to thirty below: one day the mercury freezing up and the spirit thermometer

showing 51 below. January marshalled the coldest of the days against which men and thermometers had to fight. The night of the 16th, the spirit registered 70 below, and then disappeared in the bulb. This was the coldest night ever registered in that region of cold. For eight days afterwards Nature blew her cold breath on Dawson. Heavy blankets of fog hung over the city and all the adjoining creeks. The average of those eight days was 58 below. Men walking any distance pumped the cold air into their lungs through compressed lips as though they were labouring in a race. February and March were not much warmer.

As a result of the extremely low temperatures many sleigh dogs went mad, the effect of the below zero air upon their lungs being much the same as if they had breathed fire.

(20) The awful Arctic solitude, caused by the absence of sun-light during the prolonged Winter, as well as the extremely low temperature and the lack of proper food and amusements, resulted in many tragic deaths and suicides. The following tale will serve to illustrate this fact. Two chums from the East were prospecting up Bonanza Creek in the Winter of 1899, and had great success. But during the long and dreary days of darkness they became irritable and depressed, then morose, and finally suspicious and jealous of each other. Towards Spring, when the ice began to break up, they became so distasteful to each other that they realized it was impossible for them to live together under the same roof. So they packed up their baggage and gold dust and started down stream in a rough punt which they had built. The travelling was very bad, the river being full of floating ice cakes, and they had great difficulty in getting through. However, they were soon within sight of civilization and might have reached their destination without mishap had it not been for a slight

mistake on the part of the man who was sitting in the stern steering. His chum, who was rowing, gave him a certain direction which he neglected to follow: whereupon the oarsman ceased rowing, stood up in the boat, drew his gun and shot his bosom friend through the heart, and then threw the body into the stream.

(21) The Yukon District lies between north latitudes 60° and $69^{\circ} 40'$, about the same as the southern part of Greenland. It has a total of 200,000 square miles, and is thus about twice the size of the British Isles. It is bounded on the west by Alaska proper, on the north by the Arctic Ocean, on the east by the North West Territory, and on the south by British Columbia.

It is landlocked except to the North: to reach it from the Pacific Ocean one has a choice of two routes. The first is by way of Skagway, at the head of the Lynn Canal, an inlet on that narrow strip of coast running south to Fort Simpson, ceded to the United States in 1903, and now forming part of Alaska. The other route is by the Pacific Ocean all the way to the mouth of the Yukon: from there, up the river through Alaskan territory until one reaches British soil. In either case, access to the Yukon District is circumscribed by the customs and other regulations of a foreign country.

In the early days there was no railway across the coast range and the journey to Dawson was long and roundabout. But, since the White Pass railway has been built (1900) the long trail across the mountains has been avoided. Even at the present day, however, a trip from the East to Dawson City, with all the improvements in modern travel, requires much time on account of the great distances.

From Montreal to Vancouver is 2,885.7 miles: from Vancouver by steamer to Skagway in Alaska is 900 miles: from Skagway to White Horse, by rail, 110.9 miles: and from White Horse to Dawson by boat another 460 miles, or in

Winter, by trail, 330 miles. If one wishes to go from Vancouver to Dawson all the way by steamer, the trip must be made in Summer and consists of two portions: that from Vancouver to the mouth of the Yukon River, a distance of about 2,500 miles, then up the Yukon in a flat bottomed steamer another 1,600 miles: no small journey for one who is not accustomed to ships.

The White Pass railway runs from Skagway 20.5 miles through Alaskan territory, 30.5 miles through British Columbia: and the last 59 miles are in the Yukon.

In Winter, which may begin any time after October 20th, the journey from White Horse to Dawson is made on the trail by dogs and horses, stops being made every 20 miles, where roadhouses are situated, with accommodation for winter travellers.

At the present date of writing, December, 1929, President Hoover is seriously considering the building of a motor road from Hazelton, B.C., which lies on the Skeena River and may be reached by the C.N.R., to the town of Fairbanks on the Yukon River, right in the heart of Alaska.

Although individual mining has nearly disappeared in the Yukon, its place has been taken by hydraulic mining on a large scale. The ground, instead of being thawed by woodfires and hot stones, is turned into mud by the action of steam, and the gold, which is now found only in minute grains, washed out by power.

Silver mining is also carried out on the Stewart River, as well as lead and coal mining on a smaller scale. Fox farms have added to the country's wealth, and game of all kinds is being conserved, to provide sport for the tourist and food for the natives. Agriculture is being improved in the vicinity of Dawson.

The glamour of the gold rush of the late nineties has gone, and the people of the Yukon are settling down to improve their great country, trying to devise new methods

of progress and to expand their growing industries, although handicapped by living in a high latitude close to the Arctic circle.

It may be noted here that the famous White Pass was so called after Thomas White, at one time Minister of the Interior.

(22) In 1896 two Indians, Skookum Jim and Tagish Charlie, along with a white man named George Washington Cormack, were fishing salmon at the junction of the Yukon and Klondike Rivers. Hearing of gold being found in the vicinity, they proceeded to Bonanza Creek, a small tributary of the Klondike, and staked several claims, including the famous one known as *Discovery*. This was the beginning of the gold rush to the Klondike: and, in less than two years, the whole country was alive with miners and prospectors. The Klondike was the most famous placer mining district in the world.

From the West, scrambling over the snow-clad summit of the Chilkoot Pass, or along the old Dalton trail: from the East and South, and even from the icy North: in scows and boats, by canoe, on snowshoes, on foot, up stream, down stream: travelling for weeks and months: they came in hundreds and then in thousands: until it was estimated in 1898-9 that there were 50,000 people camped in the district, and that Dawson City had a floating population of over 25,000.

Some idea of the original wealth of the region may be obtained from the fact that on Fraction A above *Discovery*, about 89 feet in length, owned by Dick Low, \$300,000 was taken out in two seasons.

Eldorado Creek ran \$1,300 to the foot, for a distance of four miles: and No. 17 at the mouth of French Gulch yielded a million and a half dollars in gold. The total out-

put for the years 1898 and 1899 was over twenty-six million dollars, and for 1900 \$22,275,000.

(23) All his valuable collections of papers, magazines, books, and interesting sketches of life in the Klondike were lost *en route*, the steamer *Islander* being wrecked on her trip from Dawson City.

(24) The only item of interest in his diary, 1906, is: "Birth of my son Tom, Dec., 1906.

(25) The District of Patricia through which Tyrrell passed on his way home, according to instructions received from Sir James Whitney, is roughly triangular in shape and lies between north latitude 50 and 57, longitudes 81 and 95 west. It is bounded on the west by the province of Manitoba, on the south by the older districts of Ontario from which it is separated by the Albany and the Winnipeg rivers, and on the north and east by Hudson Bay. It has a shore line on the Bay of 600 miles, and contains an area of about 150,000 square miles. The district as a whole is not heavily forested, although several groves of white and red pine were seen by Tyrrell, as well as some cedar, white and black spruce. The Hudson's Bay Company has many posts scattered through the country, their hunters being chiefly Crees and Ojibways whose total population is not more than 3,000 all told. The barren ground caribou frequent the open country in Summer. Fish form the staple food of the people: trout, whitefish, and suckers of various types. Several areas of rocks of the Keewatin age were crossed by Tyrrell on his journey south, indicating the presence of valuable minerals. Regarding agriculture, excellent crops of potatoes were raised by the Hudson's Bay agent at Trout Lake and many of the Indians had good fields of potatoes in other places. Most of the country had (1912) a most repellent appearance, due chiefly to lack of drainage. As

there is slope enough in many of the sections to permit of proper drainage, the agricultural possibilities are limited only by the climate.

(26) Several unsuccessful attempts were made to establish a harbour at Port Nelson. Dredges, scows, sandsuckers and other appliances were built at great expense and towed to Hudson Bay, and down the Bay to Port Nelson. But, after several years of hopeless struggling against winter gales and high tides, combined with arctic cold, the scheme was abandoned. Tyrrell's predictions were fulfilled. Breakwaters and piers which had been built with much labour and under the greatest of difficulties were washed away several times by the violent storms. Huge masses of debris were piled high and dry on the western shore, or scattered over the bars at the mouth of the river. In the last great gale several years ago the destruction was complete, and the Dominion Government decided to move to Fort Churchill.

Work is now proceeding at the latter port where there is shelter and deep water, as well as some protection from the open Bay. A railway has been completed from The Pas to Churchill, which is now operating (1930). Great hopes are being entertained concerning the future of this railway and of Fort Churchill itself. There is no doubt about the summer tourist traffic; but, for the carrying of wheat, much depends on the length of the open season and the conditions during that season of the waters of Hudson Strait. Everyone is hoping for the best.

(27) Tyrrell made his twentieth trip across the ocean and return in 1926.

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